Agricultural Sector Impacts of the Renewable Fuel Standard

Comments to Committee on Energy and Commerce

Aaron Smith
UC Davis
530-752-2138
adsmith@ucdavis.edu
http://asmith.ucdavis.edu

Below, I offer some answers to the questions posed by the committee for stakeholder comment. I would be happy to follow up in more detail.

1. *What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?*

   In research with Colin Carter and Gordon Rausser (currently under peer review), I estimate that RFS II raised corn prices by about 30% on average between 2006 and 2012. We find that corn prices would have been about 40 percent lower in 2012 were it not for the mandate. You can find the paper at this link: http://goo.gl/2LPn3

   Wolfram Schlenker and Michael Roberts created an index of corn, soybean, rice, and wheat prices. They estimate that this price index is 20% greater than it would be without US ethanol production. Their paper has been accepted for publication in the American Economic Review and you can find it here: http://www.wolfram-schlenker.com/ethanol.pdf

   If the RFS continues to be imposed, the impact on soybean prices may even outweigh the effect on corn. Corn ethanol production is currently constrained by the blend wall, which means that a massive biodiesel expansion is the only viable way to meet the RFS. This expansion will cause a huge increase in the demand for soybean oil and create another food vs fuel debate. See this excellent post at farmdoc daily: http://farmdocdaily.illinois.edu/2013/04/freeze-it-proposal-implementing-RFS2.html

2. *How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?*

   I am very skeptical of any claims about numbers of jobs created. To estimate jobs created, one needs an estimate of what the people employed in the biofuel sector would have done if there were no RFS. If those people would all have jobs in other sectors, then the RFS creates no jobs. Most studies that report such numbers merely count the number of people employed in the sector. Those studies that try to account for the counterfactual do so inadequately, which is understandable because it is a tough question to answer.

3. *Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?*

The main argument against the 2012 waiver was that ethanol is a cost effective ingredient for oil refiners and they would continue to use it even if the RFS were waived. Under this argument, waiving the mandate would not relieve other corn users from the high corn prices. I submitted a comment to the EPA on the waiver (with co-authors Colin Carter and Firas Abu-Sneneh). We argued that this claim is only true if consumers are paying the same price per gallon for gasoline that contains ethanol as they would pay for gasoline without ethanol. Because ethanol has about 30% less energy content than gasoline, consumers should pay a lower price for gasoline that includes ethanol. We don't know whether gasoline is discounted when it contains ethanol, and we are working on answering this question. However, whatever the answer to this question, someone is penalized by the RFS. Answering the question only tells us who.

In sum, if the RFS were waived, we argue that one of two things would happen: (1) If oil companies are not discounting gasoline for its ethanol content, then they would continue to "water down" gasoline with ethanol and thereby impose costs on consumers; (2) If they are discounting based on ethanol content, then we show that it would be noneconomic for them to continue using it and they would use less, i.e., the RFS has been imposing costs on either gasoline consumers or food and feed users of corn. For a shortened version of our comment, see this link: http://goo.gl/OOyPU

4. *Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?*

No opinion.

5. *What has been the impact, if any, of the RFS on food prices?*

In the U.S., not much. Only about 15% of the food bill for US households pays for the raw ingredients, the rest is processing, packaging, marketing, and transportation. So it would take a massive corn price spike to significantly affect the food bills of American consumers. However, the price effects of turning food into fuel are particularly devastating for consumers in less-developed countries, where a relatively large percentage of income is spent on food, and where grains, rather than processed foods, constitute the major portion of the diet. Ivanic, Martin, and Zaman (2011) estimate that when the World Bank's food-price index jumped by approximately 30 percent in 2010, 44 million people were forced below the extreme poverty line of US $1.25 per day. You can find the Ivanic, Martin, and Zaman paper here: http://goo.gl/ckEXI

6. *What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?*

   Based on the anemic state of the cellulosic fuel industry, I would guess very little in the next 5-10 years. Beyond that, no-one knows.

7. *What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramps up?*

   No opinion.

8. *Will the cellulosic biofuels provisions succeed in diversifying the RFS?*

   At this point, that appears unlikely.

9. *What is the scale of the impact of the RFS on international agricultural production and global land use changes?*

   This is a very difficult question to answer well, and no-one knows the answer with certainty. Because the RFS raises crop prices, it will raise production and planted acreage over what they otherwise would be. The magnitude of this effect is unknown. The aforementioned research by Roberts and Schlenker provides one credible estimate. They estimate that 2009 ethanol production increased cropland by 36 million acres, "which is the size of the total land area (not agricultural area) of the US state of Iowa."

Financial Disclosure Statement

I have no current or past financial connection to any of the stakeholders in this debate.

My co-authors and I have received funding for research on or related to this topic from:

(i) Friends of the Earth (used to pay for a graduate research assistant and to purchase data)
(ii) USDA (used to pay for graduate research assistants and for summer salary)

ActionAid USA
1420 K Street, NW, Suite 900
Washington, DC 20005

Phone 1.202.835. 1240
Email takeaction@actionaid.org
www.actionaidusa.org

actionaid

April 26, 2013

Representative Fred Upton, Chairman
Representative Henry Waxman, Ranking Member
House Committee on Energy and Commerce
rfs@mail.house.gov

Dear Representatives Upton and Waxman,

Thank you for the opportunity to comment on the agricultural sector impacts of the renewable fuel standard. ActionAid is a human rights and development organization that works in 45 countries around the world, many of which are feeling the impact of biofuels expansion on food prices and on access to land for smallholder farmers. Our work on the biofuels issue is grounded in our efforts to ensure that the most vulnerable people in the world have the ability to sustain a livelihood.

We are grateful for the opportunity to comment below on the following questions posed in your April 18, 2013 White Paper:

1. What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?

2. Was the EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

4. Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

5. What has been the impact, if any, of the RFS on food prices?

9. What is the scale of the impact of the RFS on international agricultural production and global land use changes?

In the wake of the dramatic growth in US ethanol production, spurred by the creation of the Renewable Fuel Standard (RFS) in 2005, nearly 10% of US gasoline sales are now accounted for by ethanol. There is broad consensus that US ethanol expansion, by accelerating the consumption of corn feedstocks and intensifying competition for land in the US and internationally, has been an important contributor to global food price increases.

Growth in the amount of US corn used to produce ethanol has accelerated dramatically over the past 12 years. At 13.8 billion gallons, US ethanol production today is nearly 9 times what it was in 2000, while the share of US corn going to ethanol has risen from 5% to over 40%. As we near the conventional ethanol limit of 15 billion gallons, the EPA could still grant permission for additional corn-based fuels to be substituted for yet-to-be-developed advanced biofuels under the RFS mandate, a step that could stimulate continued corn ethanol expansion beyond the 15 billion gallon mark.

Using conservative estimates of ethanol and corn prices, researchers from Tufts University's Global Development and Environment Institute estimated in an October 2012 study that from trade year 2005/6 until 2010/11, US ethanol expansion cost net corn importing countries $11.6 billion in higher corn prices, with more than half that cost, $6.6 billion, borne by developing countries.[i]

Developing countries that import the majority of their food are particularly vulnerable to the price impacts of US corn ethanol expansion. Many of these countries have become heavily dependent on outside sources of basic food over the past 25 years. These Net Food Importing Developing Countries (NFIDC) saw ethanol-related costs of $2.1 billion over the 6 year period covering trade years 2005/6 – 2010/11.[ii] Central America experienced dramatic impacts, including $368 million in higher corn import costs.

Guatemala alone absorbed $91 million in ethanol-related costs, in part because its import dependence grew from 9% in the early 1990s to nearly 40% today. The $28 million lost by Guatemala in trade year 2010/11 amounts to 6 times the level of US agricultural aid or an amount nearly equivalent to US food aid to Guatemala over the same period.[iii] From the perspective of the Guatemalan national budget, this represents a loss equivalent to over 10% of the government's annual expenditure on agriculture.[iv] This is no small thing in a country where roughly half the population falls below the poverty line and 49% of children under the age of 5 suffer from chronic malnutrition.[v]

In the North African countries of Egypt, Algeria, Morocco, Tunisia, and Libya, where rising food prices have fueled social unrest, the total cost of US ethanol expansion over the same 6-year period came to $1.4 billion, with the strongest impacts falling when unrest became widespread in 2009/10. Scaled to population, each country saw losses comparable to or greater than Mexico, where skyrocketing tortilla prices drove tens of thousands of people into the streets as over half the population suffered food insecurity and 5 million children went hungry.

Africa as a continent spent $1.6 billion more in import costs due to the rise of corn ethanol in the US since the RFS was passed. Countries in Sub-Saharan Africa are often especially hard hit by global food price spikes, since most countries in the region are net food importers and cannot afford to protect their populations from the impact of high global prices on local markets. Many countries in Africa produce corn and some, like Uganda, are even small net corn exporters. While Uganda saw a net gain in its trade balance as a result of rising corn prices, the majority of its people are still net buyers of corn. Because of this, poor urban consumers were hurt by price spikes in local markets, despite the positive overall impact on Uganda's economy.

By diverting food and feed crops into fuel production while placing extra demands on land, the expansion of industrial-scale biofuels production is clearly one of the driving forces behind the high food prices that drain resources from developing countries. By leaving mandates for land-intensive, food-based fuels in place, the US government is effectively canceling out the value of US food and agricultural assistance to developing countries and undermining US aid goals.

The RFS maintains an inflexible floor beneath ethanol demand that is downright dangerous in a time of drought and short domestic corn supplies. In response to the expanded 2007 mandate, the growth of corn ethanol has been dramatic. This growth coincided with the global food price crisis, which saw agricultural commodity prices at record highs in 2007-8, further spikes in 2010-11, and new records in

2012.

The debate over the effect of biofuels on food prices has intensified in the context of the food crisis, and the diversion of a large and increasing share of US corn to ethanol production has drawn particular attention -- deservedly so, since corn is one of the key staple food crops in the world and the primary source of calories and nutrients for nearly 1 billion people worldwide. Corn is also one of the most widely used feed crops for animals, so its availability and price have direct impacts on the price of dairy products, eggs, and meat. The US is at once the world's largest producer and exporter of corn, so changes in US corn supply and use quickly affect prices worldwide.

The upward pressure of biofuels expansion on agricultural commodity prices occurs on a number of related levels:

- The direct impact as food and feed crops are diverted for use as fuel.
- The scarcities and higher prices that result from the diversion of land from other crops into the higher-priced biofuel crop. For example, when a large amount of land is converted from growing soybeans to corn due to high corn prices, which in turn pushes up soybean prices.
- The increase in prices for food crops that serve as dietary substitutes for high priced biofuel crops. For example when demand for wheat increases as corn prices increase, leading to a decline in the use of corn as food or feed and an increase in the use of wheat.
- The rise in the value of agricultural land. Biofuel expansion increases land values, creating both practical and speculative incentives to buy land. The recent wave of "land grabs" in developing countries by resource-poor governments and international financial investors is the most worrisome expression of this trend.
- The decline in inventories of key food staples due to increased demand from biofuels, such that global markets (and prices) are more vulnerable to both sudden drops in supply or increases in demand. For example, weather-related crop failures are on the rise and are expected to increase in frequency and severity with climate change, leading to supply shocks (and concurrent price increases) that will be amplified throughout the markets if inventories remain low.
- The rise in speculative buying and selling in agricultural commodities markets. Large amounts of investment money flowed into commodities markets after the 2007 financial crisis made other types of investments more risky. Low inventories, partly due to biofuels, make such speculation more profitable for financial investors who gain from short-term price movements. This contributes to price volatility.

There is widespread agreement that biofuels expansion worldwide is a major contributor to increases in agricultural commodity prices through the direct diversion of food and feed crops to fuel uses and through competition for land to grow energy-related crops. Most estimates of the share of food price increases that should be attributed to biofuels expansion are in line with those summarized in a recent report from the National Academy of Sciences. Researchers synthesized the conclusions of 11 studies that examined the 2007/8 food price spikes, finding that between 20% and 40% of the increase in commodity prices was attributable to biofuels expansion internationally.[vi] This conclusion is consistent with the majority of studies in the field, including studies that incorporate data from 2009-11.[vii]

Complex systems scientists from the New England Complex Systems Institute have examined the impacts of

both ethanol expansion and financial speculation on corn prices. Drawing on a previously published model that quantifies the contribution of those 2 factors to overall food price movement in the last 6 years,[viii] researchers scaled the model to corn price movements and the impact on importing countries' costs. They estimate that US ethanol expansion raised prices and import costs 27% for the entire period, consistent with the range of estimates in the literature. Financial speculation added another 13%, with the largest share coming in 2007/8 when, according to their modeling, financial speculation alone increased prices and import costs by 80%.[ix]

Biofuels are projected to continue expanding globally, so price impacts are likely to persist. In 2008, the Organization for Economic Cooperation and Development (OECD) estimated that if biofuel production remained at 2007 levels, rather than doubling over the next decade as projected, prices for coarse grains (primarily corn) would be 12% lower in 2017.[x] The International Food Policy Research Institute (IFPRI) estimated last year that global biofuels expansion would boost the export price of corn by 17.7% in 2020.[xi] The 2012 OECD-FAO Agricultural Outlook Report devotes considerable attention to biofuels expansion, projecting continued growth in production and demand, with continuing impacts on prices. The agencies note that trends are particularly sensitive to oil prices and to biofuels policies in developed countries.[xii]

Last summer's drought provides an excellent illustration of how the expansion of US corn ethanol impacts global food prices. The US is historically the world's largest producer and exporter of corn. When the 2012 drought hit, the hot, dry weather withered not only the corn and soy crop but also optimistic projections of the biggest corn crop in US history.

American farmers had planted more corn than ever before, with the expectation that the US would finally be able to meet the demand for food, feed and fuel, both domestically and internationally. Instead, the drought devastated the US corn crop, bringing yield down to 123.4 bushels per acre, the lowest since the 1990s, half of which was rated by the National Agricultural Statistics Service (NASS) as poor or very poor. The diminished 2012 corn crop could have met food and feed needs in the US and on international markets. However, since the US had planned to harvest as much as 5 billion bushels for ethanol as well, fierce competition for corn erupted and corn prices spiked, with high US prices translating almost immediately to high global prices.

Corn ethanol is made from feed corn, so the first line of competition is between livestock producers and ethanol. In the face of competition for corn during the drought, livestock producers looked for lower-cost sources of feed. Internationally, importers of US corn for feed switched to importing wheat, pushing wheat prices up and broadening the impact of the drought internationally. Producers who couldn't afford corn or alternate feed for their animals began to slaughter their stock.

As global prices spiked, the threat of a food crisis loomed, alongside concern over the transmission of high global prices of corn, soy, and wheat to local markets. Food price increases in the US are expected to range from 3- 4% in 2013. The cumulative impact of this price increase will surely affect people living in poverty, those on fixed incomes, and the unemployed as well as the 1 in 6 Americans who already go hungry.

While the price impact of high commodity prices on US consumers is mitigated by the fact that processing and transport make up the majority of our food costs, this is not the case in developing countries. Moreover, where the average US consumer spends 10% of their income on food, in developing countries food accounts for between 50 – 80% of the average budget. And unprocessed food makes up a far greater

part of developing country food budgets, resulting in a greater transference from global commodity markets to generalized food price inflation.

The 2012 drought is an extreme illustration of the impact of corn ethanol expansion on food prices, but the food vs. fuel dynamic has been playing out on a less dramatic scale for the past several years. Each year, farmers planted more corn, striving to keep up with growing demand for US corn for food, animal feed, and fuel. Each year, weather shocks in the form of drought, flood or tornado have depressed some portion of the anticipated yield. Each year the demand for corn has outpaced corn production, eating away at stocks. As ratio of corn stocks to use shrinks, the market becomes more vulnerable to bad weather. It is this erosion of corn stocks that made food prices so vulnerable to the impact of the 2012 drought.

In response to the drought, multiple stakeholders called on the Environmental Protection Agency to waive the Renewable Fuel Standard. The fact that a quarter of the Senate and nearly a third of the House of Representatives joined these stakeholders in petitioning the EPA to waive the ethanol mandate demonstrates the breadth of concern about burning US corn for fuel instead of freeing it up for food or feed. Although the drought was the primary reason for tight corn stocks, the RFS was clearly a major contributing factor to the economic harm caused by the drought, exacerbating tight food stocks by continuing to mandate the production of corn ethanol despite a devastated corn crop.

Although ethanol proponents and some agricultural economists argued that an RFS waiver would only result in a small reduction in the price of corn this year, others argued that a waiver could have significantly impacted corn prices in the short-term. An August 2012 study by the Farm Foundation and a group of economists from Purdue University found that, assuming at least some short-term flexibility on the part of refiners and blenders to utilize ethanol alternatives,[xiii] a waiver could have reduced corn prices by between $0.47 - $1.30/bushel below the prevailing price.[xiv]

The degree to which a waiver could have impacted prices depends on a combination of factors including: the ultimate percentage of the corn crop destroyed, the price of oil, the degree of flexibility on the part of refiners and blenders, the size of the waiver, and the amount of available excess ethanol and/or RINs. Regardless, when one considers the net corn imports of developing countries, the savings add up. Assuming that these countries continue to import roughly 50 million metric tons of corn per year, this would mean a savings of between $900 million and $2.6 billion dollars annually.

Since the EPA denied request for a waiver last year, efforts to minimize the impact of continued ethanol production on corn prices have likely exhausted producers and blenders ability to respond to future supply shocks. With reserves of corn currently at a 9-year low, systemic reform of US biofuel policy is essential, especially as a changing climate is likely to bring weather events that depress yield with increasing frequency. While climate change must be addressed, we can't control the weather in the immediate term. What we can control is the priorities we use in meeting competing demands for our corn crop. Good policy needs to be set now to calm food price volatility and build a better balance between food and energy policies. The US Congress should:

- Reform the RFS to ensure that it does not continue to drive the expansion of corn ethanol or any other food-based or land-intensive fuel. Congress should remove volume or blending targets for corn and sugar ethanol as well as soy-based biodiesel to ensure that biofuels policies do not continue to promote food and fuel competition for land and other resources

- Act to rescind the EPA's E15 waivers and cap the amount of ethanol content in gasoline at 10%
- Require the EPA Administrator, in any year in which the Administrator reduces the applicable volume of cellulosic biofuel or biodiesel required in gasoline, to also reduce the applicable volume of renewable fuel and advanced biofuels required by the same volume.

By taking these steps, Congress can help to ensure that food comes before fuel and people come before cars. As the House Energy and Commerce Committee begins its review of the Renewable Fuel Standard, ActionAid appreciates the committee's willingness to take these concerns into account.

Sincerely,

Kristin Sundell, Senior Policy Analyst
ActionAid USA

---

[i] Wise, Timothy A. *The Cost to Developing Countries of US Corn Ethanol Expansion.* Global Development and Environment Institute. October, 2012.
[ii] ibid
[iii] USAID (2012). Foreign Assistance Data: Economic Assistance (Disbursements) by Sector, United States Agency for International Development.
[iviv] IFPRI (2012). Statistics of Public Expenditure for Economic Development (SPEED), International Food Policy Research Institute (IFPRI).
[v] MDG Achievement Fund, *Combatting Childhood Malnutrition in Guatemala.* Downloaded 4/29/13 from: http://www.mdgfund.org/country/guatemala/story/CombatingchildmalnutritioninGuatemala
[vi] National Research Council, *Renewable fuel standard: Potential Economic and Environmentla Effects of US Biofuel Policy.* 2011, The National Academies Press.
[vii] For a more detailed summary of this literature, see Wise, timothy A. (2012). *The Cost to Mexico of US Corn ethanol Expansion.* GDAE Working Paper No. 12-01. Medford, Mass, global Development and Environment Institute, Tufts University.
[viii] Lagi, M., et al., *The Food Crises: A quantitative model of food prices including speculators and ethanol conversion.* 2011, New England Complex Systems Institute: Cambridge, MA.
[ix] Lagi, Ml, A.S. Gard-Murray, and Y. Bar-Yam. Impact of ethanol conversion and speculation on Mexico corn imports. [cited April 30,2012]; Available from http://necsi.edu/research/social/foodprices/mexico/.
[x] OECD, *Rising Food Prices: Causes and Consequences.* 2008, Organisation for Economic Co-operation and Development: Paris, France.
[xi] IFPRI. *Biofuels and the Poor: A research project funded by the Bill and Melinda Gates Foundation.* 2012 [cited 2012 April 2]; Available from: http://biofuelsandthepoor.com/
[xii] OECD-FAO, *OECD-FAO Agricultural Outlook 2012-2021,* 2012, OECD Publishing and FAO: Paris.
[xiii] It should be noted, the report also finds that if refiners and blenders do not have or choose not to utilize short-term blending flexibility, a waiver would not have a short-term impact on corn prices.
[xiv] Tyner, Wallace E., Farzad Taheripour, and Chris Hurt. Potential Impacts of a Partial Waiver of the Ethanol Blending Rules. Farm Foundation and Purdue University. August 16, 2012.

Advanced Biofuels Association

Comments of the Advanced Biofuels Association

RENEWABLE FUEL STANDARD ASSESSMENT WHITE PAPER #2
Agricultural Sector Impacts

Committee on Energy and Commerce
United States House of Representatives
April 29, 2013

The Advanced Biofuels Association is pleased to be able to provide comments on your recent white paper "Agriculture Sector Impacts." The Association has over 40 standing members and represents a wide range of technologies in the Advanced and Cellulosic production sector as well as a number of new energy crop feedstock providers. We do not represent any corn ethanol producers or corn or soybean growers.

The enactment of the RFS2 provisions in the Energy Independence and Security Act in 2007 was a major factor in the development of advanced and cellulosic biofuels industry. Since the legislation's enactment, we have seen a significant number of new innovative technology companies come into the sector in hope of producing complaint gallons of renewable advanced and cellulosic biofuels. Many of these companies are also developing commercial production of renewable chemicals and products alongside compliant RFS2 fuels.

Since the enactment of the RFS2, we have seen small companies grow in size from less than 20 employees to over 400 in several instances. In addition, five of our companies are currently publically traded entities. Twelve have actually built or purchased a commercial scale plant, most of which are producing gallons and RINS for the obligated parties. An overwhelming majority of the other producing members have already built a significant demonstration or pilot plant. Five are in the process of breaking ground or plan to have commercial plants up and running by 2015. We have two companies who plan to make advanced gasoline with a RIN value of 1.6 to 1 and whose gallons would count 100% towards the RVO mandates, as they would not be a blend component but a complete replacement for traditional gasoline from oil. These companies have made the investment based on the current RFS law, and making major changes that would impact the advanced and cellulosic sector would be changing the rules in the middle of the game.

This is an outstanding success story given: that it usually takes a minimum to 24 months to engineer, site, permit and build a plant, and that the RFS2 rules were not finalized until July of 2010. Additionally, we want to call to your attention to the success the advanced industry has already achieved in the certification of the use of its fuels. The Air Force and the Navy have already approved for use in most if not all of their air frames Hydro-treated renewable jet (HRJ), marine diesel and on-road renewable diesel fuels. In addition, the Federal Aviation

800 17th Street, NW • Suite 1100 • Washington, DC 20006
T: 202.469.5140 • F: 202.955.5564 • W: advancedbiofuelsassociation.com

Administration has approved HRJ, and we have seen the first cross country as well as intra-regional fights flown by commercial airlines with the traveling public on board.

In reviewing your nine questions for comment, ABFA would like to draw your attention to the potential wide range of feedstocks which are now, for the first time, able to contribute to the development of compliant advanced and cellulosic biofuels. The statute, although not perfect, is extremely flexible and did specifically provide for a wider range of technology pathways, feedstocks and types of fuels to contribute to our overall biofuels mix. One of the specific drivers and intents of the legislation was to incentivize the development of second, third and fourth generation technologies and performance-based fuels such as those which would produce fungible, "drop in" molecules that do not require changes to pipelines, fueling stations, planes, trains and automobiles. In addition, the statute gave EPA the authority to review petitions to add new technologies, feedstocks and molecules for compliance under the RFS2 program.

One of the key principles adopted by the ABFA has been to support technology neutrality and support the development of as many feedstocks as possible. We recognize the multiple environmental factors, which must be considered in approving a new feedstock, but maintain as a principle that we should attempt to be feedstock agnostic and allow the maximum flexibility and variety of feedstocks. We also recognize that depending upon feedstock and technology, you will have different production rates vary significantly. We do, however, believe this approach will help to diversify and ultimately provide a wider range of lands to be utilized.

It is for this reasons that we are frustrated that the EPA and partner agencies have taken such a long time to approve a significant number of pending technology pathways, feedstocks and molecules. In some instances this is not the fault of EPA but the ambiguous or limited prescriptive nature of how some of the statutory definitions were written, such as the woody biomass and municipal solid waste. We need to enhance Americas' ability to use a wider range of feedstocks. As we have stated, the members of the ABFA strongly believe in and support the greater diversity of renewable fuels options for the market. We believe this will alleviate pressure on any one fuel or feedstock and create significantly more reliability and confidence that the renewable markets will continue to deliver more gallons at affordable prices moving forward.

We have included for your review the current pending pathways awaiting final determination from EPA. (EPA manifest attached Appendix I.) The inability to complete these decisions makes it far more difficult to fund or sustain a company that relies on any of these feedstocks as a turnkey for their process. In addition, the slowness of these decisions is counterproductive to the original intent to increase the number of mandated gallons moving forward. Much like a chicken and egg problem, investors are less likely to fund until they know the plant, feedstock and fuels will be compliant under the program. As we suggested in our response to your first white paper, we believe that a number of associations who represent first generation fuels are better equipped to answer inquires related to corn and soybeans.

However, there are a number of questions that are relevant to our industry and which we feel compelled to comment.

Question 1: What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?

Narrowing in on "other agricultural commodity prices," we propose a framework for you to consider in your review of these commodities and how they are treated from the standpoint of a purchaser who intends to use a feedstock to manufacture an advanced biofuel. First, many of the larger companies have full fledged trading divisions with the ability to hedge their price risk of the various feedstocks and market volatility. Second, the fluctuation of RIN price values or on-again/off-again tax provisions require producers to assess a number of variables in the decision of which feedstock to buy.

Many companies operate as "spread" businesses: the difference between what you sell your finished product for to the market vs. what you pay for your raw materials and your cost to make product. In this type of operation, a number of factors are involved: the cost of the feedstock, the value of the RIN, applicable tax credit(s), and the type of technology being used and the diversity of feedstocks available for use.

For instance, if the price of the RIN goes up significantly and the price of the feedstock a company is using goes down, it will continue to take advantage of the spread and utilize the feedstock. A second element is the types of technology any given producer may possess. Not all producers in the biomass-based diesel pool have the same flexibility in terms of the types of greases, oils, or fatty acids they are able to use. This technology is generally advanced and those who spend significant capitol for operational flexibility are able to utilize a wider array of feedstocks in an effort to ultimately become the lowest cost producer of a given type of fuel. This occurs in both the renewable diesel and biodiesel markets. This same type of advantage is also present in those who utilize different technologies with the ability to utilize different types of sugars. In short, not all technologies are created equal, and feedstocks being used can shift from one moment to the next based on the range of factors we are discussing.

This has also created an issue of some technology companies opposing the approval in the regulatory process of some feedstocks in an attempt to limit competition from more advanced technologies. This is fundamentally anti-competitive behavior and is not in the best interest of building a technology neutral or consumer price friendly environment.

Since the passage of the RFS2, we have seen a broader range of potential feedstocks that could be utilized by a wider range of technology pathways, which are able to make, not only ethanol, but butanol, hydrocarbon diesel, gasoline, heating oil, marine fuels, and jet fuels. Additionally, there are evolving types of thermo chemical, pyrolysis, and hydrolysis technologies that can use woods or existingcellulose to augment first generation production. Unfortunately at this time, only a limited number of new commercial plants have come online since the enactment of the RFS2. We are pleased to inform the committee that the first cellulosic renewable diesel gallons were placed on the EPA RIN system last year with more going online this year. In addition, we have other members who have recently started up their first commercial ethanol plants. One, however, is constrained from selling its product in the US due to EPA's lack of approval of their feedstock. This fuel is now being sold in Europe.

Question 2: How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?

The RFS2 has provided the opportunity to create an entirely new set of cash crops for American agriculture. Many of the feedstocks, which would be utilized by the advanced and cellulosic industry, represent a new brand of crop or feedstock. These new energy crops would be designed to be high in volume in terms of tons of cellulose per acre. This would lower the cost to the producer in terms of cost per ton as well as provide a good return for the farmer in terms of the amount of revenue per acre. Crops such giant mythcanthus, napier grass, arundo donax, fast growing trees such as popular and pine, in addition to many others can contribute significant diversity and take pressure off the use of traditional first generation feedstocks. It is our expectation that this will lead to significant employment in the sector.

It also further extends the ability of the industry to diversify, not only the feedstock aspect of biofuels away from traditional row crops, but also allow the innovation of many advanced and cellulosic technology platforms. This helps to diversify the opportunity for various regions of the country to participate in the development of advanced and cellulosic fuels. The South East has particularly benefited from this trend line as we see companies already operating commercial facilities in Florida, Louisiana, and Mississippi. One plant alone in Louisiana employs close to 100 people from the local community and made the fuels which the Navy demonstrated in the RIM PAC Naval exercise last July. We should also note that we now have our first algae demonstration plant running in New Mexico while another company is demonstrating their algae to ethanol technology in Florida. All of these gallons diversify our nations energy options as well as provide gallons in addition to the first generation manufacturers.

Question 3: Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

The criteria which has been used by the EPA are very specific (Appendix II) and set an extremely high bar in order for the EPAto make a finding in support of waiving the RFS. One of the most challenging issues facing the question of waiving the RFS is the interconnectivity of the RFS2 and the nesting provisions. In terms of making a decision to waive a certain component of the RFS2, such actions can have cascading impacts across the broad range of pools, which may not necessarily be impacted by a drought of a particular crop such as corn or soybeans. Our concern as the advanced biofuels industry was the potential negative impact on the financial community in terms of the overall RFS moving forward. If a waiver had been granted, we were concerned their confidence that the government will continue to stand behind the RFS2 would be shaken, making it more difficult to fund the building of the plants of the future. However, we are confident in EPA's decision making process and that the RFS provides enough flexibility to alleviate any market concerns.

Question 6: What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?

Cellulosic biofuels could have a profound impact by augmenting the production of ethanol from sources other than the existing corn feedstock. Additionally, it should be noted that those currently utilizing corn are attempting to increase their production of ethanol from the existing

resource by utilizing the corn stalks as a means of providing more feedstock diversity in their own operations. Several cellulosic plants are currently being built to achieve such results by at least three different companies. ABFA believes both the advanced and cellulosic sectors, if given continued federal policy support, can provide significant gallons of fuels from a wider range of feedstocks to fulfill the RVO targets set by EPA. We acknowledge that there are a wide range of factors affecting the price of corn and will leave those discussions to those who utilize corn for their feedstock. The Department of Agriculture has also a significant history and database regarding these issues and should be consulted.

Moreover, it should be observed that many advanced and cellulosic companies are currently planning to manufacture ethanol or butanol that could be utilized in the gasoline pool along with the current ethanol. This certainly creates a greater diversity for the marketplace. Butanol allows for a higher blending level per gallon and can be commingled with current gasoline containing ethanol as well as separately with gasoline. As it receives a 1.3 to 1 RIN credit, it could conceivably relieve some of the current concerns surrounding the so called blend wall. All of these options help to reach the overall mandated renewable pool moving forward. Another factor which has come into play recently is the fact that some fuels can comply in either the conventional pool (D6) or the advanced pool (D5), as their gallons are all nested under the overall renewable mandates. The challenge is getting the new plants built in order to provide more volume and flexibility.

In addition, many of the specific energy crops like Freedom ® Giant Miscanthus (FGM) have had no previous commercial value and therefore have not been grown in any appreciable acreage except for research and development purposes. The RFS has created the need for literally millions of acres of these crops throughout the United States to sustain the feedstock supply for the growing production of cellulosic biofuels. Most specifically grown energy cellulosic biomass crops, grown on marginal soils not used for food production, use minimal amounts of supplemental water, and require lower inputs of nitrogen than traditional food crops. Many specifically grown energy cellulosic biomass crops, are perennial and only require annual harvesting after establishment thereby reducing the amount of energy required to produce the crop. FGM, along with many specifically grown energy cellulosic biomass crops, also produce dry ton yields two to three times greater than traditional biomass crops thereby producing more gallons per acre. Specifically grown energy cellulosic biomass crops have the long-term potential to greatly reduce the amount of corn used in traditional ethanol production.

Question 7: What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramps up?

The growth of cellulosic biofuels production and the resultant numerous acres of specially grown energy cellulosic biomass crops needed to sustain the biomass feedstock supply required will create a brand new dynamic economy in rural America. A relatively small, twenty to twenty-five million gallon cellulosic biofuel refinery requires approximately thirty to forty thousand acres of a variety of cellulosic biomass feedstocks to sustain the cellulosic biomass feedstock supply chain required to produce the gallons. Since most of the specifically grown energy cellulosic biomass feedstocks grow on marginal soils, many unused fallow acres will be used to provide farmers with an additional cash crop on previously unproductive land and both the direct jobs

needed to operate the cellulosic bio refinery and ancillary support jobs, which will provide an economic boom on rural economies.

A second major point for consideration is the range of fuels that will become available from these second and third generation plants. Many are planning to produce diesel, gasoline, or jet fuels as if they were produced in a traditional facility. These fuels will be able to be utilized without changes to the infrastructure straight from the factory. They hold higher energy density, so consumers will travel farther on the same gallon. Additionally, they receive higher value under the RFS2 energy density provisions, so they make it far easier to comply with the overall mandated target EPA chooses for the future.

Lastly, if the woody biomass feedstock definitions were broadened by EPA, it could provide access to many areas currently off limits and could spur a new generation of forestry and energy crops. Other crops such as energy cane also offer promise. Already, we have one member who is planting energy cane in California as a means to have a reduced GHG ethanol available and compliant with the Low Carbon Fuels Standard. These are exciting new options, which augment the existing industry and offer growth for agriculture and forestry.

Question 8: Will the cellulosic biofuels provisions succeed in diversifying the RFS?

We believe the cellulosic provisions provide a minimum floor to attempt to stimulate and stand up a cellulosic industry. As interpreted by the recent federal district court ruling, the RFS provisions only can support mandating gallons that are projected to be produced. The RFS provides a minimal support mechanism, which has been meaningful in building confidence for companies to invest in building the future plants. For others, it has been the catalyst to receiving financing. The challenge is that many of these plants are extremely capital intensive.

In closing, we urge the committee to closely focus on the advanced and cellulosic pools, as they will play a significant role in terms of delivering compliant gallons to comply with the RFS mandates. Already EPA has increased the size of the biomass-based diesel pool in 2013 and witnessed the compliance of the 2012 advanced target of 2.25 billion gallons. We believe both targets could again be raised in 2014 and will be met with a range of gallons from a variety of technologies.

The cellulosic biofuels provisions will absolutely diversify the RFS compliant gallons that will be produced in the United States as evidenced by the number of plants which are currently putting steel in the ground. The Committee must be aware that there is no single cellulosic biomass feedstock that will serve the need for the industry. Cellulosic biomass feedstocks will vary by geography and region requiring diversity. The RFS is essential to continue the demand for more cellulosic biomass feedstock crops to be planted. The number of gallons produced is directly proportionate to the available cellulosic biomass feedstock supply available.

We thank the Committee for your interest in the Renewable Fuels Standard, and we stand ready to answer any questions you may have.

Submitted by:

Michael McAdams

President
Advanced Biofuels Association

800 17th Street, NW • Suite 1100 • Washington, DC 20006
T: 202.469.5140
F: 202.955.5564
E: michael.mcadams@hklaw.com
W: advancedbiofuelsassociation.com

Appendix A

Pending Pathway Assessments

The following pathway requests have been received and are under review:

National Cottonseed Products Association Biodiesel, renewable diesel New (cottonseed oil) Transesterification

Company	Fuel	Feedstock	Process
11 Good Energy, Inc.	*New (G2 Diesel)*	Soy bean oil, Oil from annual cover crops, Algal oil, Biogenic waste oils, fats, greases, and Canola oil	Esterification
Arvens Technology, Inc.	Biodiesel	*New (pennycress)*	Transesterification
BP Biofuels North America, LLC	Cellulosic biofuel	*New (energy cane)*	Any
	Cellulosic biofuel	*New (napiergrass)*	Any
Chemtex Group	Cellulosic biofuel	*New (arundo donax)*	Any
Conestoga Energy Partners, LLC, and Bonanza Bioenergy, LLC	Ethanol	*New (grain sorghum)*	*New (proprietary)*
Diamond Green Diesel, LLC	*New (renewable naphtha)*	Biogenic waste oils, fats, greases	Hydrotreating
DriveGreen, LLC	*New (renewable electricity)*	Landfill biogas	*New (proprietary)*
EdeniQ, Inc.	Ethanol	Corn kernel fiber	Any
E Energy Adams, LLC	Ethanol	Corn	*New (proprietary)*
Element Markets, LLC	CNG	Biogas from anaerobic digesters	Any
Emerald Biofuels LLC, Global Clean Energy Holdings, and UOP LLC	Renewable diesel, jet fuel, and naphtha	*New (Jatropha)*	Hydrotreating
Emerald Biofuels LLC and Global Clean Energy Holdings	Biodiesel		Transesterification
Gevo	Isobutanol	Corn	*New (proprietary)*
Golden Renewable Energy, LLC	Renewable diesel	*New (municipal sewage sludge)*, Biogenic waste oils, fats, greases	*New (proprietary)*
Green Vision Group	Ethanol	*New (energy beets)*	Fermentation
Growing Power Hairy Hill	Ethanol	*New (wheat starch)*	*New (proprietary)*
ICM	Ethanol	Corn	*New (proprietary)*
Iogen	Ethanol	*New (grain sorghum)*	*New (proprietary)*

Kior, Inc.	*New (renewable gasoline blendstock)*	Cellulosic biomass	*New (proprietary)*
Montana Advanced Biofuels, LLC	Ethanol	*New (barley, wheat starch residue)*	Fermentation
National Cottonseed Products Association	Biodiesel, renewable diesel	*New (cottonseed oil)*	Transesterification
National Sorghum Producers	Ethanol	*New (biomass sorghum)*	Any
Osage Bio Energy, LLC	Ethanol	*New (barley)*	Fermentation
Permeate Refining, LLC	Ethanol	Non-cellulosic separated food waste	Any
POP Diesel, Inc.	*New (un-transesterified plant oil)*	*New (jatropha oil)*	*New (proprietary)*
Rothsay Biodiesel	*New (biodiesel)*	Biogenic waste oils, fats, greases	Transesterification
Solazyme	Biodiesel, renewable diesel, jet fuel	Carbohydrate, Algae	Transesterification Hydrotreating
Sundrop Fuels, Inc.	*New (renewable gasoline)*	Cellulosic biomass	*New (proprietary)*
Terrabon, Inc.	*New (renewable gasoline)*	Cellulosic biomass	*New (proprietary)*
WM GTL, Inc.	Cellulosic Diesel	*New (landfill biogas)*	Any

Please note: Only official petitions submitted in accordance with the requirements of Section 80.1416 of the RFS 2 regulations are included on this list, which will be updated on a regular basis, but is only current as of the date at the bottom of this page.

Once an official determination is made for a pathway request, it will be removed from this list and posted in the Completed Pathway Assessments section below.

In addition to the above pathway requests, we are also conducting pathway analyses of new feedstocks including palm oil, camelina, grain sorghum, sweet sorghum, and pulp wood.

Appendix B

conditions before making a decision to either grant or deny a waiver. The many important public submissions in response to EPA's solicitation of comment have affirmed the importance of addressing the waiver issue in a prompt and transparent fashion.

IV. Key Interpretive Issues

Section 211(o)(7) of the CAA provides that EPA may waive the mandated national RFS volume requirement in whole or in part based on a determination by the Administrator that: (i) "implementation of the requirement would severely harm the economy or environment of a State, a region, or the United States," or (ii) "that there is an inadequate domestic supply." The 2012 waiver requests are all based on claims of severe economic harm to states, regions and/or the country as a whole associated with implementation of the RFS requirements in light of the drought experienced in large agricultural production areas of the country this summer. Therefore, the relevant statutory provision authorizes a waiver if EPA determines that RFS implementation "would severely harm the economy of a State, a region or the United States."

In the August 30 Notice, EPA sought public comment on its interpretation of this provision as discussed in the context of the 2008 Texas waiver determination. EPA's responses to the comments received are set forth in section VI of this determination. For reasons more fully described in that section, EPA continues to interpret this statutory provision as it did in 2008. Thus, it would not be sufficient for EPA to determine that there is severe harm to the economy of a State, region or the United States; rather, EPA must determine that RFS implementation would severely harm the economy. Furthermore, EPA interprets the word "would" as requiring a generally high degree of confidence that implementation of the RFS program would severely harm the economy of a State a region, or the United States. EPA interprets "severely harm" as specifying a high threshold for the nature and degree of harm. Although there are many factors that affect an economy, the RFS waiver provisions call for EPA to evaluate the impact of the RFS mandate itself. EPA does not evaluate the impact of the RFS volume requirements in isolation, but instead evaluates them in the context of all of the relevant circumstances, including in this case the impact of the drought. However the purpose of this analysis is to characterize the impact of the RFS mandate itself, within this context. Finally, because the statute specifies that EPA "may" grant a waiver if it determines that implementation of the RFS requirements would severely harm the economy of a State, a region or the United States, the statute provides EPA with discretion to decline to issue a waiver even if it finds that the severe harm test is satisfied. This discretion allows EPA to take into consideration the possible impacts of issuing a waiver that extend beyond the geographic confines of a particular State or region. EPA believes that such consideration is particularly appropriate in light of the statutory requirement that any RFS waiver be nationwide in scope.[16] To the extent relevant to the waiver requests before it, EPA has applied this interpretation in reaching a decision on the waiver requests.

V. Technical Analysis

To evaluate the impact that implementation of the RFS would have on the amount of ethanol produced and consumed over the relevant time period, and the resulting impacts, if any, on the agricultural and other industries, we applied the same analytical framework EPA used in evaluating the 2008 waiver request. We first assessed what impact implementation of the RFS program would have on ethanol production and consumption, and thus corn prices, by conducting our own analysis using a model developed by Iowa State University. We then evaluated the impacts such changes, if any, would have on a set of key factors, including corn prices, feed prices, food prices, and fuel prices. A number of commenters submitted analyses looking at similar issues, and we reviewed those studies as part of our overall evaluation. Throughout this section we also address various comments we received in response to the August 30 Notice.

1. Methodology

(a) Analytical Model

To assess the impact of implementation of the RFS, EPA evaluated two scenarios: one in which no waiver is granted and another in which a waiver of the total renewable fuel mandate is granted, as discussed below. As we did in evaluating the 2008 Texas waiver request, EPA utilized an economic model developed by researchers at Iowa State University (ISU model). During development of the analytical framework used in 2008, EPA evaluated different models and modeling approaches, and we refer readers to that discussion for more detail.[17]

EPA believes the ISU model continues to be the most appropriate choice for a number of reasons. First, as discussed in 2008, EPA believes it is critical to use a stochastic framework to capture a range of potential outcomes, rather than a point estimate, given potential variation in a number of critical variables associated with ethanol production (e.g., corn yields, gasoline prices). Second, the ISU model captures the interaction between agricultural markets and energy markets, and is able to examine the impacts of uncertainty in variables within both sectors. The ability of the ISU model to account for this variability across both sectors gives the model an advantage over other models that are locked into a single projected fuel price or corn crop estimate. Third, documentation for the ISU model is relatively straightforward and transparent compared to other options, and allows all interested parties to understand the assumptions that drive the results.[18] Fourth, the ISU model was designed to be easily and regularly updated with the most recently available data, such as USDA's World Agricultural Supply and Demand Estimates (WASDE) and the Energy Information Administration's (EIA) Short Term Energy Outlook (STEO) reports, making it useful for analysis looking at fairly short time frames (e.g., within one year into the future).[19, thnsp;20] Finally, we note that the ISU model has been used in analytical work conducted outside EPA; reports based on such work are and have been available in the public domain for review. We are using a model, in other words, that has been subjected to external scrutiny independent of our own analysis. By way of example, many commenters cited a non-EPA study that used the ISU model and same basic approach we adopt here to analyze potential impacts of a waiver in 2012.[21] EPA is not aware

[16] Section 211(o)(7) reads, in relevant part, that the "Administrator * * * may waive the [RFS] requirements * * * by reducing the *national quantity* of renewable fuel * * *". Emphasis added.

[17] 73 FR 47173 (August 13, 2008).

[18] For a recent example of this documentation, see: Babcock, B. "Updated Assessment of the Drought's Impacts on Crop Prices and Biofuel Production." ["Babcock-Iowa State."] Center for Agricultural and Rural Development, CARD Policy Brief 12–PB 8, August 2012, available in the docket and at *http://www.card.iastate.edu/policy_briefs/display.aspx?id=1169.*

[19] *http://www.usda.gov/oce/commodity/wasde/.*

[20] *http://www.eia.gov/forecasts/steo/.*

[21] Babcock-Iowa State.

of any significant technical criticism of the ISU model itself.[22]

The ISU model is a stochastic equilibrium model that projects, among other outputs, the prices of corn, ethanol and blended fuel given uncertainty in six variables: U.S. corn yields, U.S., Brazilian, and Argentinean soybean yields, U.S. wholesale gasoline prices, and Brazilian ethanol production.[23] The analysis simulates 500 scenarios, and for each one the model independently picks a value for each exogenous factor (such as U.S. corn yield) by randomly selecting from a probability distribution curve for that factor. Since the probability of the specific value of a given corn yield is built into the distribution curve for corn yields, the greater the probability of a certain corn yield, the more likely it is that the model will pick that value for any scenario. The result is that the distribution of the random draws for each exogenous factor fairly reflects the probability of the various uncertain variables. For each of the 500 scenarios, the model projects ethanol production and the prices of corn, ethanol, and blended fuel based on the values picked for the exogenous factors for that run. As mentioned above, we ran the model with and without a waiver, modeling 500 different scenarios, to assess the impact of a waiver.

For the results described below, EPA made modifications to the model in preparation for the current analysis. At EPA's request, ISU researchers updated their model with data from the October WASDE and STEO reports. After consultation with DOE, we also modified the demand curve for ethanol to reflect our understanding of flexibility in refinery markets over the next twelve months. A full description of the ethanol demand curve developed in consultation with DOE can be found in the docket.[24] We discuss the issue of refiner flexibility more fully in Section V.1.d below. Further, as detailed in Section V.1.c below, the model utilizes EPA estimates regarding excess, or ''rollover'' RINs, that will be available for use for compliance purposes in the 2012/2013 corn marketing year time period. The time period analyzed is discussed in Section V.1.b below. The estimates of rollover RINs are based on information submitted to EPA related to RIN generation. Additional details on the model changes and assumptions made for EPA's analysis are included in the docket.[25]

(b) Scope of Technical Analysis

To analyze the impact of implementation of the RFS, our technical analysis focused on the volume of renewable fuel representing the difference in volume between the advanced biofuel requirement and the total renewable fuel requirement. This is the portion of the total volume requirement that is currently met almost exclusively with corn ethanol.[26] EPA compared circumstances with and without a waiver to identify the impact properly associated with the use of corn ethanol in the implementation of the RFS program for the 2012/2013 corn marketing year.[27]

We note that several of the States requested a waiver of RFS requirements ''in 2012 and 2013,'' although the various waiver requests were not always specific with respect to the time period for which the waiver was requested. EPA focused its technical analysis on the 2012/2013 corn marketing year (which runs from September 1, 2012, to August 31, 2013) for a number of reasons. All of the petitioners referenced the serious drought conditions as the underlying reason for waiving the RFS volume requirements. The drought primarily affects the 2012/2013 corn marketing year, and the harm claimed by the requesters was the impact of taking corn from the reduced crop affected by the drought and using it to produce ethanol as a transportation fuel. The corn crop at issue is the 2012/2013 corn marketing year crop, and it is ethanol produced from this corn crop that was the overwhelming focus of the waiver requests. Focusing the technical analysis on the production of ethanol during this same 2012/2013 time period focused the analysis on the time period where implementation of the RFS volume requirements was claimed to be the source of the harm. In addition, focusing on the 2012/2013 marketing year is consistent with the petitioners request to waive the RFS requirements ''in 2012 and 2013'' since it would cover portions of both calendar years. Finally, while other time periods are possible to analyze, data is often reported on a marketing year basis, and analysis of commodity markets is frequently done similarly. The WASDE data used in our analysis, as well as all other USDA projections of U.S. corn yields, production, and prices, are done within this same time frame.

EPA received comment that a waiver granted for some or all of 2013 might have impacts on market dynamics in the 2013/2014 corn marketing year, and that EPA is not limited to assessing only a one-year impact.[28] Commenters state that a waiver granted for some or all of the 2013 RFS compliance year would make more RINS available for use in 2014, when the RFS standards are higher, and that such a waiver would provide ''relief'' in 2013/2014. In considering the time frame used for this technical analysis, EPA recognizes that we have discretion in determining the appropriate time period to analyze. In this case, however, and as described above, we focus our analysis on the 2012/2013 corn marketing years as that is the time period where the requesters claim that implementation of the RFS volume requirements would severely harm the economy. Evaluating whether implementation of the RFS volume requirements would severely harm the economy after the end of the 2012/2013 corn marketing year would require a new set of assumptions regarding future crop yields, gasoline costs, refining market behavior, and other parameters, which can be projected but are less certain at this time.[29] EPA believes that evaluating the potential impacts of implementation of the RFS volume requirements in 2013/2014 should take into account information on the 2013/2014 corn crop, as well as updates on other information used in the analysis. While it is possible to look over a longer time period, as some of the studies

[22] The assumptions and inputs used within any model are of critical importance to modeled results, and we explain our selection of key inputs below.

[23] These variables are called exogenous factors, or uncertain variables. The gasoline price put into the model is a ''petroleum only'' price, meaning that it represents a gallon of gasoline that contains no ethanol.

[24] See memo to the docket from the Department of Energy on ethanol demand for further information.

[25] See memos to the docket describing the ISU model (''Description of Iowa State University Stochastic Model'') and detailing EPA modeling results (''EPA Stochastic Modeling Results'') for more information.

[26] Note that the RFS program does not require that this volume of renewable fuel be met through use of corn based ethanol; any other renewable fuel can also satisfy the requirement.

[27] While some of the requests for a waiver do discuss a ''whole or partial'' waiver, our analysis focuses on a waiver of the full amount between the advanced biofuel requirement and the total renewable fuel requirement. Analyzing scenarios with and without the volume requirements in place helps evaluate the full impacts of the RFS program. Because we find that it is unlikely that the RFS requirements are having an impact in the time period analyzed, we do not address the question of a partial waiver. If waiving the entire volume requirement were to have no impact, then we would not expect waiving just a portion of the requirements to have an impact.

[28] For example, see comments submitted by National Pork Producers Council, available at EPA–HQ–OAR–2012–0632–2209, stating that ''benefits of [a] waiver do not need to coincide with waiver period'' at 26.

[29] For example, using gasoline prices for longer-term projections necessarily involves a higher degree of uncertainty. The same goes for projections related to crop yields.

submitted to EPA attempt to do,[30] assessing impacts over a longer time period introduces an additional set of variables that increase the uncertainty of any analytical results.

To the extent parties believe that implementation of the RFS program would severely harm the economy in 2014 because of the production of renewable fuel from corn, then a future waiver request that focuses on the harm in that time period could present analysis and arguments addressing the impact of implementation of the RFS volume requirements during that time period. For example, the availability of rollover RINs in future time frames could be more limited, a fact which could impact the results of such an analysis. However as noted above assessing those issues now would involve a high degree of uncertainty. To the extent parties assert that implementation of the RFS volume requirements would severely harm the economy in 2014 because of market based limits on the volume of ethanol in gasoline (typically referred to as the blendwall, as blends greater than E10 or E15 may only be marketed to flexible fuel vehicles), then a future waiver request that focuses on this issue could present information and analysis addressing the relevant issues. However, it would be more appropriate to consider such issues in a future annual RFS rulemaking setting the volume requirements for years after 2013.

In a related vein, EPA also received comments related to EPA's ability to renew a waiver beyond a one-year time frame.[31] Other commenters suggested that EPA should grant a waiver for two years. The statute provides that a waiver granted under section 211(o)(7) of the Act ''shall terminate after 1 year, but may be renewed by the Administrator after consultation with the Secretary of Agriculture and the Secretary of Energy.'' EPA interprets this provision to mean that Congress intended the length of time for which a waiver should be granted to be one year, and that EPA may consider, in consultation with USDA and DOE, whether the period should be extended. Such consultation would be in the context of evaluating the economic impacts of the initial waiver as well as whether severe economic harm is still being caused by implementation of the RFS volume requirements. EPA does not need to decide now the scope of its authority for a renewal of a waiver, especially since EPA is denying the waiver requests that are before it. EPA clearly has authority to grant a waiver for a period of one year only, and any renewal would need to be the subject of a separate, if related, action.

For these reasons, with respect to assessing the impact that implementation of the RFS will have on ethanol production levels, and to evaluating the impacts and potential degree of harm from implementation of the RFS on corn prices and other factors, EPA believes that it is appropriate in this case to focus its technical analysis on impacts that occur from the production of ethanol in the 2012/2013 corn marketing year.

EPA's technical analysis focuses on whether the RFS mandate has an effect on corn ethanol production and consumption over the 2012/2013 marketing year. EPA recognizes that the drought affecting much of the nation during 2012 has affected not only corn yields, but also other crops used in the production of renewable fuels, most notably soybeans, which are used as a feedstock in biomass-based diesel (BBD) production. EPA also received comment arguing that a waiver should analyze impacts on all potential feedstocks and volume standards under RFS.[32] EPA chose to focus our technical analysis on conventional ethanol, corn prices, and related impacts primarily because the requesting States and other parties as well as commenters focused the overwhelming majority of their discussion on ethanol production, corn price changes, and subsequent impacts from those increased corn prices on industries that use corn as an input (e.g., feed, livestock, and poultry industries). These parties assert that the RFS is creating demand for corn for use in production of transportation fuel, and that reducing that demand via a waiver would result in making additional corn available for other end uses and reduce prices of corn. Because the focus of the requesting parties is on corn and corn ethanol, we believe it is reasonable to similarly concentrate our technical analysis on the impacts of a waiver affecting the portion of the total renewable fuel mandate that is currently satisfied with conventional renewable fuel RINs, the majority of which represent corn-based ethanol.

At the same time, some of the requesting States mentioned the drought's impacts on soybean crops, and many of the requesting States requested a waiver of ''applicable volumes'' of renewable fuel.[33] While EPA did not conduct its own technical analysis of these issues, EPA considered the technical analysis and other information submitted by commenters, and has determined that a waiver should not be granted for the RFS biomass-based diesel volumes. We discuss the biomass-based diesel and cellulosic volume requirements in section V.6.

(c) Availability of Rollover RINs

Under the RFS program, RINs are valid for compliance purposes for both the calendar year in which they are generated and the following calendar year. By regulation, the amount of an obligated party's Renewable Volume Obligation (RVO) that can be met using previous-year, or ''rollover,'' RINs is capped at 20 percent. EPA explained our interpretation of the relevant statutory provisions, and our reason for establishing a cap of 20 percent, in the 2007 RFS final rulemaking on RFS.[34] For purposes of the current analysis, the number of rollover RINs available during the 2012/2013 marketing year affects the impact of implementation of the RFS volume requirements in 2013.

The specific number of rollover RINs available for use in the 2012/2013 marketing year is an input into EPA's stochastic modeling. To the extent that the number of rollover RINs is greater, the RFS requirements could be met with less production and blending of ethanol in 2013. The converse is the case if the number of rollover RINs is less. As discussed in Section V.1.d, we believe that refiners and importers, the parties obligated to comply with a renewable volume requirement, at least in many cases, have reasons other than the RFS program for choosing to rely on ethanol blending for compliance purposes. However, to the extent that the RFS program also creates such pressure, rollover RINs reduce it in a given time period by increasing compliance flexibility for obligated parties. It also provides more flexibility for renewable fuel producers. From the perspective of the ISU model, one rollover RIN is equivalent to one liquid gallon of ethanol: both equally satisfy the RFS requirements, and thus both are sources of ethanol to draw upon in the model.

Based on the most current data available from the EPA Moderated Transaction System (EMTS), EPA

[30] See, for example, ''Renewable Fuel Standard Waiver Options during the Drought of 2012,'' Food and Agricultural Policy Research Institute, University of Missouri, Report #11–12, October 12, (''FAPRI-Missouri''), available in the docket.

[31] National Pork Producers Council comments at EPA–HQ–OAR–2012–0632–2209.

[32] See, for example, comment from Chevron at EPA–HQ–OAR–2012–0632–2306.

[33] See, for example, the waiver request letter from the Governor of Utah, at EPA–HQ–OAR–2012–0632–2486, requesting a waiver ''as to have the maximum impact on the price of corn and soybeans * * *''.

[34] 72 FR 23935 (May 1, 2007).

projects that obligated parties will collectively be able to roll over 2 to 3 billion 2012 vintage RINs into the 2013 compliance period. EMTS currently reports that approximately 3.5 billion 2011 vintage D6 RINs are available for use towards 2012 compliance. As discussed above, no more than 20 percent of a given year's renewable fuel standard can be met with RINs from the previous year.[35] That requirement is 15.2 billion gallons in 2012, meaning that as many as 3.04 billion 2011 RINs can be carried over for 2012 compliance.[36] Since these 2011 vintage RINs expire at the end of the 2012 compliance period, obligated parties have a strong incentive to use these RINs first, carrying over any excess 2012 RINs into the 2013 compliance period. Based on this incentive and supported by conversations with industry and governmental stakeholders, EPA believes that obligated parties will utilize the maximum possible amount of 2011 RINs (i.e., 3.04 billion RINs out of a total 3.46 billion RINs available) for 2012 compliance and not let them expire.

Based on total 2012 EMTS data available to date, we project for purposes of this analysis that D6 RIN rollover into the 2012/2013 marketing year period will exceed 2.0 billion. Total D6 RIN generation for 2012 has already exceeded 10.8 billion gallons. Monthly generation of D6 (general renewable fuel) RINs was approximately 1.05 billion in October of 2012, only slightly lower than the 1.1 billion RINs generated in October of 2011 and just below average for 2012 as a whole.[37] If monthly RIN generation holds constant at October levels for the rest of 2012, rollover of 2012 vintage RINs to 2013 would likely exceed 2.6 billion. If RIN generation increases in November and December of 2012, as it did in both 2010 and 2011, rollover RIN availability would likely exceed 2.7 billion and could potentially be even higher. Thus in all of these scenarios, it is expected that at least 2.0 billion rollover RINs will be available for the 2013 compliance year. Further information on RIN rollover projections is also available in the docket.[38]

[35] 40 CFR 80.1427.

[36] 3.04 billion RINs is 20 percent of the total renewable fuel requirement for 2012 (i.e., 15.2 billion gallons).

[37] Even if D6 RIN generation declines by 10 percent monthly in November and December of 2012, we expect that the number of 2012 vintage D6 RINs available after obligated parties fulfill their 2012 compliance obligations would still exceed 2 billion, and would likely exceed 2.5 billion. See ''RIN Rollover'' memo in the docket for more information.

[38] See ''RIN Rollover'' memo in the docket.

Several studies prepared by non-EPA researchers observe, and we agree, that the availability of rollover RINs can significantly affect the potential impact of implementation of the RFS volume requirements. Some studies have suggested that, in scenarios where rollover RINs are relatively scarce, waiving the effective conventional renewable fuel volume requirement might lead to a significant decrease in corn prices. However, if significant numbers of rollover RINs (i.e., 2.0 billion or more) are available, these studies suggest that the effect of a waiver is significantly smaller.[39]

EPA recognizes that the estimate of rollover RIN availability used in the ISU model (and other models) can have a significant effect on the results of the modeling. For purposes of our analysis, EPA assumed that no more than 2.0 billion rollover RINs would be available for use in the 2012/2013 time period. As discussed above, current data suggest that RIN rollover is likely to be higher or even significantly higher than this. We believe 2.0 billion rollover RINs is a conservative analytical assumption.

Historically refiners and blenders have blended more ethanol than required due to its favorable economics, leading to the large carryover RIN balance discussed above. EPA received comment suggesting that even if the blending economics were not favorable for ethanol, refiners and blenders might look forward to future obligations and purposefully over-comply with the RFS requirements in 2013 to increase their ''bank'' of relatively low-cost RINs that could be carried into 2014, in case they anticipate RIN prices to be higher then. If such behavior were to take place, ethanol production in the 2012/2013 corn marketing year would be higher than the level projected in the ISU modeling results. The implication is that the waiver could have a slightly larger impact on ethanol production and corn prices than what is projected in the ISU modeling results. If this type of over-complying behavior were to take place, we would expect demand for ethanol to be right at the E10 blend wall limit in 2012 and 2013. However, the empirical data does not support the theory that obligated parties are over-complying to the maximum extent that they can bank RINs today, since there is still a small but significant gap between the volumes of ethanol consumption our modeling projects for next year and the estimated E10 blend wall. Even if parties were to engage in over-compliance for banking purposes in 2013, their desire to do so would likely be limited by their ability to blend ethanol into low level blends (i.e., E10). Therefore, we do not believe that this type of behavior would have any appreciable effect on our analysis for this waiver decision.

[39] See Babcock-Iowa State. See also Purdue University/Farm Foundation study,''Potential Impacts of a Partial Waiver of the Ethanol Blending Rules,'' EPA–HQ–OAR–2012–0632–0025.

(d) Flexibility in the Refining Sector

In assessing the impact of implementing the RFS volume requirements in the 2012/2013 time frame on ethanol production, a key consideration is the economic incentives for refiners to use ethanol during that time frame as well as the ability of refiners and fuel blenders to reduce, over that one-year timeframe, the quantity of ethanol currently being blended into the gasoline pool. As ethanol production and availability in the U.S. has increased over the past 10 years, the economics of blending ethanol into gasoline have been such that many refiners have transitioned from producing primarily finished gasoline to producing primarily blendstocks for oxygenate blending (BOBs) which require the addition of ethanol in order to meet the specifications of finished gasoline. However, assuming refiners wanted for business reasons to reduce the quantity of ethanol blended into the gasoline pool, refiners would have to seek alternative high octane blend stocks or significantly adjust refinery operations to make up for the volume and octane increase they currently receive from ethanol. Logistical challenges to the refined product distribution system would also have to be overcome in parallel with the necessary refinery operation changes.[40]

As mentioned, currently most refiners produce a sub-octane unfinished gasoline lacking oxygenates called blendstocks for oxygenate blending (BOBs). These BOBs are transported through fuel pipelines or other modes to petroleum product terminals where they are then blended with ethanol and become finished gasoline. Since ethanol is generally not produced near large refineries and may absorb water and impurities that normally reside in petroleum product pipelines, a separate ethanol distribution system has been established to distribute and ultimately blend ethanol into BOBs at terminals to produce the finished fuel.

[40] See Department of Energy memo on ethanol demand, available in the docket, for further information. See also EPA memo, ''Economics of Ethanol Blending and Refining Sector Flexibilities,'' available in the docket.

One reason refiners choose to blend ethanol into gasoline is for purposes of boosting gasoline octane levels. Ethanol has an octane value of 115 (R+M/2) while finished gasoline's pump octane value ranges from 87–93.[41] Ethanol also has a value as a gasoline extender when blended into the gasoline pool. Other properties of ethanol, such as its volatility and low sulfur and benzene content, influence its value to refiners. Each refiner is expected to make decisions about ethanol blending independently, in light of the value they place on these factors and the complexity and uniqueness of each refinery. Where the blending of ethanol is profitable to refiners we expect that they would continue to blend ethanol into the gasoline pool even in the absence of a renewable fuel requirement.[42]

After consultation with DOE, review of comments, and analysis undertaken by EPA, we determined that, assuming refiners had an economic incentive to reduce ethanol blending, refiners have limited flexibility to make the necessary adjustments to reduce ethanol blending if a one year waiver of the RFS program were granted under projected scenarios for ethanol and gasoline prices. Our modeling inputs reflect this determination.[43] At current ethanol and crude oil prices, the blending of ethanol into gasoline is an economically beneficial practice for refiners, and based on EIA forecasts this is expected to continue through at least 2013. However if that were to change and blending ethanol into gasoline was no longer an economically beneficial practice for refiners, we believe that the challenges at both the refinery level and in the refined product distribution system would be significant deterrents to reductions in ethanol blending in response to a one-year waiver. Studies conducted by independent organizations such as Morgan Stanley and Hart Energy, among others, support our assumption that refiners would be limited in their ability to reduce ethanol blending if a one year waiver of the RFS requirements is granted under current economic circumstances.[44] For example, Morgan Stanley argues that there would be significant impediments to moving away from ethanol because it is widely available and is the least expensive source of octane/oxygenates for most refineries. Similarly, Hart Energy estimates that ethanol's octane value and the cost of partially replacing ethanol use will limit the economic attractiveness to refiners of using less ethanol even with a waiver. They conclude that because an RFS waiver cannot force a reduction in domestic ethanol usage or exports, a waiver would likely have a small, if any, effect on reducing corn prices based on the continued demand for ethanol under current market economics.

EPA also received comments from the American Petroleum Institute, Chevron, and Marathon Petroleum Company stating that a one year waiver would be unlikely to result in a significant decrease in ethanol blending.[45] Though we did receive some comment arguing that refiners could make operational changes quickly, commenters provided little evidence upon which to assess this claim. These comments are likely based on historical practices when splash blending of ethanol was much more prevalent and refining and distribution had not optimized toward the use of ethanol.

Several commenters cited the challenges that refiners would face in reducing the quantity of ethanol blended into the gasoline pool in the near term as justification for a longer-term waiver.[46] These commenters stated that doing so would allow the refining industry sufficient time to address the operational and logistical challenges mentioned in the previous paragraphs and be necessary to result in reduced ethanol demand and consequent relief from high corn prices to affected industries. While we recognize that analyzing a longer period could affect the results of our modeling, EPA did not conduct such an analysis here for the reasons discussed above, including the high uncertainty involved in projecting relevant conditions further into the future. As such our technical analysis is based on the impacts of implementation and a potential waiver over a period of one year.

2. Projected Impact of Implementation of the Renewable Fuel Standard

We ran the ISU model with the updates and inputs described above and here describe the outputs. The ISU model projects that the average expected amount of conventional ethanol produced in the United States during the 2012/2013 corn crop year without a waiver will be 12.48 billion gallons. ISU's model predicts that for 89 percent of the simulated scenarios, waiving the RFS requirements would not change the overall level of corn ethanol production or overall U.S. ethanol consumption in 2012/2013 because in the event of a waiver the market would demand more ethanol than the RFS would require. For those 89 percent of the scenarios, waiving the RFS requirements would therefore have no impact on ethanol use, corn prices, ethanol prices, or fuel prices. We refer to that model result as an 89 percent probability that the RFS will not be ''binding'' in the 2012/2013 marketing year. Conversely, in 11 percent of the simulated ISU model runs the RFS would be binding. In those 11 percent of the random draws, the resulting market demand for ethanol would be below the RFS requirement and, therefore, the RFS would require greater use of ethanol than the market would otherwise demand. The binding scenarios are generally those in which projected fuel prices and corn yields are both unrealistically low, with both gasoline prices and corn yields in 2012/2013 falling significantly below their current DOE and USDA projections.[47] In those cases, the RFS would have an impact, albeit a limited or moderate one, on ethanol use and the food and fuel markets in the United States.

The ISU model assumes corn ethanol would account for at most 13.6 billion gallons of the RFS volume requirement during the 2012/2013 corn marketing year. Because the corn marketing year is split over two RFS compliance years, the 13.6 billion gallons is based on the fraction of the marketing year that would occur in the 2012 compliance year (one-third) and the 2013 compliance year (two-thirds). EISA requires 15.2 billion gallons of renewable fuels in 2012 and 16.55 billion gallons in 2013; however, 2 billion gallons of the 2012 volume and 2.75 billion gallons of the 2013 volume

[41] Octane rating or octane number is a standard measure of the performance of a motor or aviation fuel. The higher the octane number, the more compression the fuel can withstand before detonating.

[42] EPA acknowledges that the blending economics for ethanol are significantly different for E10 and E85. Our ethanol demand curve takes these differences into consideration, resulting in large drop in the ethanol to gasoline price ratio at the volume of ethanol that corresponds to the E10 blendwall.

[43] We note that our analysis does take into account different fuels where appropriate, including imported ethanol derived from sugarcane.

[44] Morgan Stanley, ''Ethanol Demand a Function of Economics, Not RFS,'' August 7, 2012. Hart Energy Special Report, ''U.S.: RFS Waiver Unlikely to Affect Ethanol Use,'' October 12, 2012. Both analyses are available in the docket.

[45] Comments submitted by American Petroleum Institute, EPA–HQ–OAR–2012–0632–2240, Chevron, EPA–HQ–OAR–2012–0632–2306, and Marathon Petroleum Company, EPA–HQ–OAR–2012–0632–1968.

[46] See for example National Chicken Council comments, EPA–HQ–OAR–2012–0632–1994 and Grocery Manufacturers Association comments, EPA–HQ–OAR–2012–0632–2341.

[47] Were we to use the November WASDE estimates, the percentage of time that the RFS requirements are projected to be not binding would be even higher, due to the increase in the lower end of the corn yield projections.

must be from advanced biofuels. While advanced biofuels, including biomass-based diesel, advanced ethanol, and cellulosic biofuels are included in the ISU model we focus our analysis on evaluating the effects of a waiver of the portion of the RFS volume requirement filled by corn ethanol (see Section V.1.b). The full results from this analysis are included in the docket. The modeling projects that 2.0 billion gallons of rollover RINs from 2012 will be used to meet the 13.6 billion gallons during this time period.

Certain empirical data also support the projection that the RFS is unlikely to be binding in the 2012/2013 timeframe. For example, the price of tradable renewable identification number (RIN) credits remains relatively low: below five cents per gallon as of September 26, 2012. Refiners and importers verify their compliance with the RFS by collecting and retiring RINs, which are assigned to volumes of renewable fuel by their producers. Refiners and importers use RINs for an appropriate volume of renewable fuel to demonstrate compliance with their RFS volume requirement. Parties that exceed their RFS obligations for a compliance period can trade excess RINs to other parties that need them for compliance, or under certain conditions, can bank them for future compliance. When the RFS requirement is expected to be binding, we would expect the demand for RINs would increase and the supply of excess RINs to decrease, leading to an increase in RIN prices.

Therefore, we expect the current RIN price reflects the market's current and near-term expectations about how binding the RFS is likely to be. Recent RIN prices represent a very small share of the price of a gallon of ethanol, suggesting that refiners and blenders expect the RFS is not likely to be binding in 2012 or 2013. It is possible that RIN prices have been depressed by market uncertainty generated by the recent waiver requests. However, the record high RIN price before these waiver requests was only approximately 6.5 cents per gallon. In this particular case, the empirical RIN price information corroborates the modeled impacts of the RFS.

3. Analysis of the Degree of Impact

When evaluating the economic impacts of implementation of the RFS volume requirements, our analysis centered on four major areas: average U.S. corn prices, food prices, feed prices, and fuel prices. While there may be other areas of potential impact, we focused on these areas because they are expected to have the largest potential economic impacts in the U.S. Given the time available for this analysis, we have not looked at the interaction of these impacts in an integrated modeling system. However, we believe that looking at these indicators individually provides a useful framework for determining the impact of the RFS volume requirements.

As discussed above, the body of information shows that it is very likely that the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame, and therefore no impact on corn, food, or fuel prices. In the unlikely event that the RFS program would have an impact on the corn and other markets during the 2012–2013 timeframe, its nature and magnitude is described below. Our analysis considers the impact in three ways (1) when the RFS volume requirements are not binding (89% of the scenarios), (2) the average across all 500 scenarios, binding and not binding, (3) and the average across the binding scenarios (11%). As a bounding exercise, we also provide information on a ''worst case'' scenarios from within the binding scenarios (see Section V.3.e below).

(a) Corn Price Impacts

Based on the ISU modeling results, the average expected impact of waiving the RFS requirements over all the potential outcomes would be a decrease in the price of corn by $0.07/bushel. This average result must be considered in context, however, since our analysis projects that it is highly likely that the RFS volume requirements are not binding, and that the impact on corn prices will be zero. There is only an 11% chance that the requirements will be binding. Because of this, we project that it is highly likely that the impact of waiving the RFS program is zero change in corn prices. However, in the subset of potential outcomes in which the RFS requirements are binding (11 percent of the results), waiving the program would result in an average expected decrease in the price of corn of $0.58/bushel. This leads to a non-zero average impact across all 500 scenarios, even though the most likely result is still zero impact. Table V.3.a–1 presents the ISU scenarios.

TABLE V.3.a–1—RANGE OF ESTIMATED CORN PRICES

	Iowa State mean estimate	Iowa State when RFS does not bind	Iowa State when RFS binds
Mean Corn Prices with Mandate ($/bushel)	$8.02	$8.00	$8.15
Mean Corn Prices with Waiver ($/bushel)	$7.95	$8.00	$7.57
Change in Corn Prices with Waiver ($/bushel)	−$0.07	$0.00	−$0.58
Percentage of Runs	100%	89%	11%

(b) Food Price Impacts

In consultation with USDA, EPA estimated how these projected changes in corn prices would influence U.S. food prices. It is highly likely that the RFS volume requirements are not binding and there will be no impact on food prices. The results of the modeled corn price impacts discussed above appear to be modest for both the mean estimate and the subset of scenarios in which the RFS requirements are binding (see Table V.3.b–1). A $0.07/bushel decrease in corn prices would result in a 0.04% decrease in Food consumer price index (CPI) and a 0.006% decrease in All Item CPI. A $0.58/bushel decrease in corn prices would result in a 0.35% change in Food CPI and a 0.049% change in All Item CPI. For the average household, a $0.07/bushel decrease in corn prices would result in a reduction of household expenditures on food equal to $2.59 in 2012/2013, while a $0.58/bushel decrease in corn prices would result in a savings of $22.68.

Since people in the lowest income groups are more sensitive to changes in food prices, we also analyzed the impact of changes in food expenditures as a percentage of total consumer expenditures and as a percentage of income. The changes in food expenditures are relatively small compared to total consumer expenditures for both average and low income households. When comparing the changes in food expenditures relative to income, the impact on low

income households is larger than the impact on average households. Additional details on the methodology used to calculate the CPI and household expenditures are included in the docket.[48]

TABLE V.3.b–1—IMPACTS ON FOOD PRICES, CPI INDICATORS, AND HOUSEHOLD EXPENDITURES

	Units	ISU mean estimate	ISU when RFS binds
Change in Corn Prices with Waiver	$/bushel	−$0.07	−$0.58
Change in Food CPI with Waiver	Percent	−0.04	−0.35
Change in All Item CPI with Waiver	Percent	−0.006	−0.049
Change in Annual Food Expenditures for Average Household with Waiver	$	−$2.59	−$22.68
Change in Annual Food Expenditures for Lowest Quintile Household with Waiver	$	−$1.42	−$12.46
Change in Food Expenditures as a Percentage of Consumer Expenditures for Average Household with Waiver.	Percent	−0.005	−0.047
Change in Annual Food Expenditures as a Percentage of Consumer Expenditures for Lowest Quintile Household with Waiver.	Percent	−0.007	−0.061
Change in Food Expenditures as a Percentage of Income After Taxes for Average Household with Waiver.	Percent	−0.005	−0.046
Change in Food Expenditures as a Percentage of Income After Taxes for Lowest Quintile Household with Waiver.	Percent	−0.0065	−0.057

(c) Feed Price Impacts

Using WASDE projections (which assume the mandate is in place) for feed costs in 2012/2013, we estimated that U.S. feed prices are projected to be $318.45/ton, using a weighted average use of corn, sorghum, barley, oats, and soybean meal. In estimating the impact of a change in corn prices on feed costs, we used a simplifying assumption that the percentage change in corn prices is applied to all components of the feed grains components used in this analysis. Since the price of other feed grains tend to track the price of corn, we believe this simplifying assumption is a realistic estimate of how feed grains will track each other with changes in corn prices. It is highly likely that the RFS volume requirements are not binding, and there will be no impact on feed prices. We estimated the potential impact of granting the waiver on feed costs for the corn price scenarios described in the previous sections: the ISU mean estimate of a $0.07/bushel decrease in corn price and the subset of ISU scenarios in which the mandate is binding ($0.58/bushel decrease in corn price).

TABLE V.3.c–1—U.S. FEED PRICES

	2009/10	2010/11	2011/12	2012/13
Feed Cost ($/ton) without Waiver	$158.17	$212.93	$255.38	$318.45
Decrease in Feed Costs, $/ton ($0.07/bushel corn price change scenario)				−$1.88
Decrease in Feed Costs, $/ton ($0.58/bushel corn price change scenario)				−$16.50

Source: October 10, 2012 WASDE.
Note: Feed is equal to the weighted average sum of feed use of corn, sorghum, barley, and oats plus domestic use of soybean meal.

Based on USDA's estimates for U.S. livestock feed costs and returns, we estimated the impact of a percentage change in feed costs per unit for poultry, hogs, fed cattle, cow-calfs, and milk production. Details on the methodology used to calculate feed impacts are included in the docket. Using USDA's production and slaughter estimates, we aggregated the potential feed cost impacts of a waiver for the U.S. and the States that requested a waiver. Table V.3.c–2 presents the estimated changes in total nationwide and statewide feed costs due to the corn price changes observed in our modeling, alongside 2011 livestock revenue and GDP. As Tables V.3.c–3, V.3.c–4, and V.3.c–5 show, in dollar terms, the largest sectors of the livestock industry that could potentially benefit from the waiver are the cattle and dairy industry. However, as a portion of total feed costs, the impacts are similar across livestock types. As stated above, it is highly likely that the RFS volume requirements are not binding and there will be no impact on feed prices. However, we present the potential impacts from the corn price changes noted above in order to illustrate what might happen under those circumstances.

When considering impact of the implementation of the RFS volume requirements, EPA considered the impacts in both absolute terms and relative to the entity being affected, since impacts will be more meaningful for some states than others. Texas, for example, sees the largest dollar value feed impacts among states that requested a waiver. Our average projected corn price impact of $0.07/bushel represents a decrease of $35.2 million in total feed costs. However, this is only a 0.6 percent decrease in total Texas feed costs, which is equivalent to approximately 0.2 to 0.4 percent of State livestock revenue. In the 11 percent of cases where we modeled the RFS requirements as binding, we project that a waiver might decrease Texas feed costs by about $308.5 million (a 2.0–3.8 percent decrease in feed costs).

In a State like Arkansas, where livestock revenue represents about 3.5 percent of state GDP (the largest proportion of any state that requested a waiver of the RFS mandate), the impact of the waiver might be expected to have a larger impact. However, here we see only a 0.5 percent decrease in feed costs in the $0.07/bushel case, which is equivalent to only a 0.06 to 0.1 percent impact on State livestock revenue.

[48] See USDA memo on Food CPI and Food Expenditures in docket.

TABLE V.3.c–2—2011 GROSS DOMESTIC PRODUCT, 2011 LIVESTOCK REVENUE, AND PROJECTED TOTAL FEED COSTS AND ESTIMATED DECREASE WITH RFS WAIVER FOR COMBINED CATTLE, POULTRY, PORK, AND DAIRY PRODUCTION IN THE U.S. AND STATES REQUESTING A WAIVER

	Total feed costs without waiver (million $)	Decrease in feed costs in million $ ($0.07/bushel corn price change scenario)	Decrease in feed costs in million $ ($0.58/bushel corn price change scenario)	2011 State livestock revenue (million $)	2011 GDP (million $)
U.S.	77,802.37	−451.93	−3,964.30	123,400	14,981,020
AR	526.83	−2.84	−24.95	3,900	105,846
DE	364.77	−1.88	−16.49	700	65,755
FL	738.80	−4.31	−37.80	1,340	754,255
GA	1,619.71	−8.69	−76.19	3,900	418,943
MD	295.42	−1.66	−14.52	1,000	301,100
NM	1,289.02	−7.61	−66.78	2,100	79,414
NC	2,728.98	−15.32	−134.37	5,400	439,862
TX	6,041.58	−35.17	−308.47	10,800	1,308,132
UT	538.24	−3.18	−27.87	917	124,483
VA	1,006.17	−5.63	−49.40	1,800	428,909
WY	23.00	−0.14	−1.19	840	37,617

In addition to examining total feed costs in each state, we analyzed the impacts on the three main segments of the livestock industry: cattle and dairy, pork, and poultry and eggs. Here we present both the projected national-level impacts of a waiver and the impacts in selected States (chosen either because their livestock industry is large or because we observed a larger proportional impact on their market in cases where the mandate affects corn prices).

As observed above, it is highly likely that the RFS volume requirements are not binding and there will be no impact on these industries. Our analysis suggests that implementation of the RFS program, when binding, has a proportionally greater impact on the cattle and dairy industries, and those industries would consequently see greater cost reductions from a waiver in those scenarios. National cattle and dairy feed costs would decrease by 0.6 percent with a waiver. Texas, New Mexico, and Florida see the largest cattle and dairy feed cost impacts of a waiver in total dollar value, while Delaware and Utah would, along with Florida and New Mexico, see the largest cattle and dairy feed impacts from a waiver as a proportion of their total revenue in this sector. These outcomes indicate that, if the RFS volume requirements were binding, these are the states where a waiver may have the most impact on economic activity related to cattle and dairy. We present the impacts on their sectors below in Table V.3.c–3. In the $0.07/bushel case, the impact of a waiver in all of these states is less than a 1 percent reduction in cattle and dairy feed costs. This reduction represents a change of approximately 0.35 percent of Texas livestock revenue and a change of approximately 0.38 percent for New Mexico and Florida. In Delaware, the state where the change in feed costs has the greatest proportional effect on the cattle and dairy industry (due to the small size of this sector in Delaware), this reduction in costs would be equivalent to a 0.5–0.8 percent increase in cattle and dairy revenue and an approximately 0.0002 percent increase in Delaware State GDP. Impacts in Delaware would increase to 4.5–7.1 percent of cattle and dairy revenue in the $0.58/bushel scenario. A full comparison of these impacts to cattle and dairy revenues is available in the docket.[49]

TABLE V.3.c–3—TOTAL FEED COSTS AND ESTIMATED DECREASE WITH RFS WAIVER FOR CATTLE AND DAIRY PRODUCTION IN THE U.S. AND SELECTED STATES REQUESTING A WAIVER IN MILLIONS OF DOLLARS

	Total feed costs without waiver (in million $)	Decrease in feed costs in million $ ($0.07/bushel corn price change scenario)	Decrease in feed costs in million $ ($0.58/bushel corn price change scenario)
U.S.	49,518.32	−292.44	−2,565.30
TX	5,114.25	−30.20	−264.94
NM	1,288.82	−7.61	−66.77
FL	533.78	−3.15	−27.65
UT	482.60	−2.85	−25.00
DE	27.75	−0.16	−1.44

[49] See memo on ''Livestock Impacts'' in docket.

The proportional impact of a waiver on the national pork industry is projected to be about the same as cattle and dairy, approximately 0.6 percent. Of the states that submitted waiver requests, we project that the combined pork industry of North Carolina and Virginia would benefit the most from a waiver if the RFS volume requirements were binding, followed by Texas and Arkansas.[50] A $0.07/bushel decrease in corn prices is projected to reduce hog feed costs by just under $10 million in North Carolina and Virginia. We project an average savings of $87.35 million in cases where the mandate is binding. Impacts on pork revenue and State GDP in Texas and Arkansas would be smaller in both absolute and proportional terms. Impacts in Florida and Delaware, where the impact on the pork sector is much smaller in absolute terms but represents a large percentage of total pork revenue, in the $0.07/bushel case would represent less than 1 percent of their respective state livestock revenues and less than one thousandth of a percent of their State GDPs.

TABLE V.3.c–4—TOTAL FEED COSTS AND ESTIMATED DECREASE WITH RFS WAIVER FOR PORK PRODUCTION IN THE U.S. AND SELECTED STATES REQUESTING A WAIVER

	Total feed costs without waiver (in million $)	Decrease in feed costs in million $ ($0.07/bushel corn price change scenario)	Decrease in feed costs in million $ ($0.58/bushel corn price change scenario)
U.S.	14,439.12	−85.27	−748.02
NC/VA	1,686.06	−9.96	−87.35
TX	51.95	−0.31	−2.69
AR	27.21	−0.16	−1.41
FL	4.30	−0.03	−0.22
DE	1.93	−0.01	−0.10

The proportional impact of a waiver on the national poultry and egg industries is projected to be slightly smaller than those that might accrue to cattle and dairy and hogs, approximately 0.5 percent. The impacts of a waiver on the poultry industry are also the smallest of the three sectors in absolute terms. Of the states that submitted waiver requests, we project that Georgia's poultry industry would benefit the most from a waiver if the RFS volume requirements were binding, followed by North Carolina and Texas. A $0.07/bushel decrease in corn prices is projected to reduce Georgia poultry feed costs by 6.74 million. We project feed cost savings of $59.11 million in cases where the mandate is binding. We project that poultry revenue impacts in North Carolina and Texas would be smaller in absolute terms but roughly equal proportional terms. Impacts in Utah and Florida would be equivalent to a larger portion of total poultry revenue, but would still only represent between 0.1 and 0.3 percent of revenue in the $0.07 per bushel case.

TABLE V.3.c–5—TOTAL FEED COSTS AND ESTIMATED DECREASE WITH RFS WAIVER FOR POULTRY AND EGG PRODUCTION IN THE U.S. AND SELECTED STATES REQUESTING A WAIVER

	Total feed costs without waiver (in million $)	Decrease in feed costs in million $ ($0.07/bushel corn price change scenario)	Decrease in feed costs in million $ ($0.58/bushel corn price change scenario)
U.S.	13,844.94	−74.21	−650.98
GA	1,290.01	−6.74	−59.11
NC	1,136.26	−5.91	−51.86
TX	875.37	−4.66	−40.83
FL	200.72	−1.13	−9.92
UT	51.48	−0.30	−2.65

In their waiver requests, most States cited quantitative impacts on their agricultural sectors that are already realized or projected to occur due to the drought. EPA recognizes the significant impacts that the drought has had on state and national agricultural sectors. However, as we discuss above, the analytical task before us is to determine whether implementation of the RFS volume requirements themselves severely harm the economy. Most of the States that submitted waiver requests discuss the crucial role that corn prices play in the overall financial health of their livestock industries, but for the most part these States did not attempt to quantify in detail the impact of waiving the RFS on corn prices and the livestock industry. Various commenters in the livestock sector did provide analysis attempting to quantify the possible impact of a waiver on corn and soybean meal prices; these studies or the analyses such studies rely on are examined in Section V.4.b below.[51]

In summary, our analysis suggests that it is very likely that the RFS volume requirements will have no impact at all on ethanol production volumes in the

[50] The pork industries of North Carolina and Virginia are here analyzed together, owing to the fact that both are dominated by the operations of one company. Because of this, their pork feed costs and revenues are intertwined and are here examined together.

[51] See, for example analysis prepared for the North Carolina Poultry Federation at EPA–HQ–OAR–2012–0632–2429, and comments submitted by the Virginia Poultry Federation at EPA–HQ–OAR–2012–0632–2066.

relevant time frame, and therefore no impact on corn or feed prices. EPA looked, however, at what impacts on corn and feed prices might be in the unlikely event that the RFS mandate would have an impact on the corn and feed prices during the 2012/13 time frame. EPA assessed feed price impacts at the national level, State level, and at the individual sector level within eleven States. EPA believes that analyzing the feed price impacts on the nation, States, and individual sectors at the national and State levels is appropriate and provides further evidence upon which to base this decision, even considering the low probability that the RFS volume requirements will have an impact on ethanol production volume, and therefore corn and feed prices, in the relevant time frame. Given the low probability of the RFS having an impact in that time frame, and the estimated impact to state livestock sectors, EPA did not analyze any further geographical areas, as we consider the analysis above sufficient basis upon which to base our decision.

EPA received comment that, during a period of drought, impacts attributable to the RFS, even if relatively small, could be enough to influence firm-level decisions regarding whether to continue operations or to shut down. Since our analysis indicates that the RFS is highly unlikely to have an impact on ethanol production, and therefore corn prices, in the time period of concern, and our analysis necessarily focuses on the level of an economy, as opposed to the firm-level, we did not conduct analysis assessing the incremental impact the RFS would have, if any, on individual firms.

(d) Fuel Price Impacts

The ISU model also predicts changes in U.S. ethanol, gasoline, and blended fuel prices based on changes in ethanol production volumes. EPA's analysis indicates that it is highly likely that the RFS volume requirements are not binding and there will be no impact on fuel prices. The ISU modeling projects that the average impact across all modeled scenarios is that waiving the RFS mandate would decrease blended gasoline prices by 2/10 of one cent.[52] Blended gasoline prices in the ISU model decrease slightly on average across all of the modeled scenarios because ethanol prices decline by roughly one cent with less ethanol demand, for the limited scenarios where the RFS volume requirements are binding. We note, however, that this estimate should be considered within the limitations of the ISU model. The ISU model is not a refinery or fuel system model, and does not consider responses in the fuel markets to a reduction in U.S. ethanol demand in any depth. We include an estimate here to examine the potential magnitude of changes on average across all of the modeled scenarios, but we note that these results are based on a fairly simplistic approach to estimating blended gasoline price impacts.

TABLE V.3.d–1—RANGE OF ESTIMATED ETHANOL AND BLENDED GASOLINE PRICES

	Units	ISU mean estimate
Mean Ethanol Price with Mandate	$/gallon	$2.90
Mean Ethanol Price with Waiver	$/gallon	$2.89
Mean U.S. Corn Ethanol Production with Mandate	billion gallons	12.48
Mean U.S. Corn Ethanol Production with Waiver	billion gallons	12.44
Blended Gasoline Price with Mandate	$/gallon	$2.918
Blended Gasoline Price with Waiver	$/gallon	$2.916
Change in Blended Gasoline Price	$/gallon	$0.002

Given the limitations associated with our estimate on fuel price impacts, we present the projected average impact on fuel prices in Table V.3.d–1 as a sensitivity analysis. Were blended gasoline prices to change as the ISU model projects as a result of a waiver, this is the average impact we might expect to see. Based on these small predicted changes in blended gasoline prices, the overall impacts on the economy as it relates to fuel prices are also expected to be modest. It is highly likely that the RFS volume requirements are not binding and there will be no impact on fuel prices. Our analysis shows that a $0.002/gallon decrease in blended gasoline price for the Iowa State mean scenario would be expected to change the Energy CPI by 0.029%. Details on the methodology for determining these impacts are included in the docket.[53]

For the average household that owns a vehicle, the $0.002/gallon change in gasoline prices would result in a $1.98 decrease in annual gasoline expenditures in 2012/2013. When analyzing the impact of these changes on the lowest income groups, the absolute expenditures on gasoline are lower than for the average household, due to the fact that this segment of the population tends to drive fewer miles on average.

TABLE V.3.d–2—IMPACTS ON ENERGY CPI AND GASOLINE EXPENDITURES FOR AVERAGE AND LOW INCOME HOUSEHOLDS

	Units	ISU mean estimate	ISU when mandate binds
Change in Blended Fuel Price with Waiver	$/gallon	−$0.002	−$0.016
Change in Energy CPI with Waiver	Percent	−0.029%	−0.225%
Change in Annual Expenditures on Gasoline for Average Households with Vehicles.	$	−$1.98	−$17.40
Change in Annual Expenditures on Gasoline for Lowest Quintile Households with Vehicles.	$	−$1.20	−$10.49
Change in Gasoline Expenditures on Gasoline as a Percentage of Consumer Expenditures for Average Households with Vehicles.	Percent	−0.004%	−0.035%

[52] As with the average impact on corn prices, this figure is potentially misleading, in the sense that it is a non-zero outcome even though the most likely impact is zero (see Section V.3.a above).

[53] See Department of Energy memo on Energy CPI in docket.

TABLE V.3.d–2—IMPACTS ON ENERGY CPI AND GASOLINE EXPENDITURES FOR AVERAGE AND LOW INCOME HOUSEHOLDS—Continued

	Units	ISU mean estimate	ISU when mandate binds
Change in Gasoline Expenditures as a Percentage of Consumer Expenditures for Lowest Quintile Households with Vehicles.	Percent	−0.005%	−0.048%
Change in Gasoline Expenditures as a Percentage of Income After Taxes for Average Households with Vehicles.	Percent	−0.003%	−0.028%
Change in Gasoline Expenditures as a Percentage of Income After Taxes for Lowest Quintile Households with Vehicles.	Percent	−0.012%	−0.104%

Some commenters argued to the contrary, claiming that waiving the RFS would significantly impact the price of fuel. They argue that if less ethanol is blended into gasoline as a result of a waiver, then the demand for petroleum-based gasoline would increase, putting an upward pressure on the world price of oil. In turn, the increase in petroleum prices would boost overall blended fuel prices. For example, a recent 2012 study by authors at Louisiana State University found that ''* * * every billion gallons of increase in ethanol production decreases gasoline price as much as $0.06 cents''.[54] Other studies such as Du and Hayes from Iowa State University have suggested that increases in ethanol production over the last decade have reduced overall blended fuel prices.[55] Thus, a waiver which reduced the use of ethanol would have the effect of raising blended fuel prices. We note that there is disagreement about the extent of these impacts (see, for example, Knittel and Smith and others).[56] In any case, the Du and Hays and Knittel and Smith studies do not address the specific case at hand, the fuel price impacts of a waiver of the RFS mandate.

As mentioned above, our analysis indicates that it is highly likely that waiving the RFS mandate would have no impact on ethanol volumes. The ISU modeling predicts that the average impact across all modeled scenarios is that waiving the mandate would decrease ethanol demand by only 40 million gallons, and in 89 percent of the modeled cases the mandate is not binding. As a simplifying assumption, the ISU model does not take into account any potential impacts on the global oil markets, which we believe is a reasonable assumption in this situation given the small change in ethanol volumes that are projected in this analysis. Even in the 11 percent of the cases where the mandate was binding, changes in world oil market would be so small as not to change the overall conclusions of the study.

(e) Worst Case Scenario

As a bounding exercise, we also considered a ''worst case'' scenario that could occur if both corn yields and gasoline prices were at the low ends of the probability distributions used in our modeling. This worst case example considered the 1 percent of scenarios (five out of five hundred) where a waiver could have the largest potential impacts on corn prices. In this worst case scenario, the impact of waiving the mandate could decrease corn prices by $1.86/bushel, with a correspondingly larger impact on livestock, food, and fuel prices. It is highly unlikely that the combination of extremely low corn yields (approximately 116 bushels per acre) and wholesale gasoline prices (approximately $1.96/gallon) would occur simultaneously during the 2012/2013 corn marketing year. However, we have included more information on this worst case scenario in the docket for illustrative purposes.

4. Overview and Discussion of External Analyses

Comments submitted to EPA referenced or included a number of analyses and studies examining the impact of a potential waiver of RFS standards. These include studies from: Hart Energy, Irwin and Good (University of Illinois),[57] Carter, Smith, and Abu-Sneneh (University of California-Davis),[58] Purdue University and the Farm Foundation (Purdue/Farm Foundation), FAPRI-University of Missouri (FAPRI-Missouri), Babcock-Iowa State, Edgeworth Economics,[59] the Energy Policy Research Foundation, Inc. (EPRINC),[60] Cardno-ENTRIX,[61] Dr. Thomas Elam of FarmEcon LLC,[62] and the Department of Environment, Food, and Rural Affairs of the United Kingdom government (DEFRA).[63] Some of the studies focus more on fuel market impacts, while other studies concentrate specifically on U.S. agricultural sector impacts. Multiple alterative assumptions and options are explored across the different sets of analyses of a waiver of the RFS2 volume requirements making comparison of results challenging. Only a few of the studies are based on a fully integrated view that directly attempts to link detailed agricultural commodity markets with fuel market assessments to assess the impact of implementation of

[54] Marzoughi H. and Kennedy, P. Lynn, ''The Impact of Ethanol Production on the U.S. Gasoline Market'', Paper presented at the Southern Agricultural Economics Association Annual Meeting, February, 2012, available in the docket or at *http://EconPapers.repec.org/RePEc:ags:saea12:119752*.

[55] Xiaodong Du, Dermot J. Hayes, ''The Impact of Ethanol Production on U.S. and Regional Gasoline Markets: An Update to 2012,'' Center for Agricultural and Rural Development, Iowa State University, May 2012, available in the docket or at *http://www.card.iastate.edu/publications/synopsis.aspx?id=1166*.

[56] Christopher R. Knittel and Aaron Smith, ''Ethanol Production and Gasoline Prices: A Spurious Correlation,'' July 12, 2012, available in the docket or at at *http://web.mit.edu/knittel/www/papers/knittelsmith_latest.pdf*.

[57] Irwin, S. and Good, D., ''Ethanol—Does the RFS Matter?'' August 2, 2012, available in the docket or at *www.farmdocdaily.illinois.edu/2012/08/ethanoldoes_the_rfs_matter.html*.

[58] Comment submitted by Carter, Smith and Abu-Sneneh, EPA–HQ–OAR–2012–0632–2245.

[59] Edgeworth Economics, ''The Impact of a Waiver of the RFS Mandate on Food/Feed Prices and the Ethanol Industry,'' October 10, 2012, submitted in comments from Growth Energy, EPA–HQ–OAR–2012–0632–2357.

[60] Energy Policy Research Institute Foundation Inc., ''Ethanol's Lost Promise,'' EPA–HQ–OAR–2012–0632–2231.

[61] Urbanchuk, J., Cardno-ENTRIX, ''Impact of Waiving the Renewable Fuel Standard on Total Net Feed Costs,'' September 2012, submitted with comments from Renewable Fuels Association, EPA–HQ–OAR–2012–0632–2218.

[62] Elam, T., FarmEcon LLC, ''Ethanol RFS and 2012 Drought Impact on Virginia Agriculture'', August, 2012, and ''Ethanol RFS and 2012 Drought Impact on North Carolina Agriculture and Consumers'', September, 2012. Submitted with comments by the North Carolina Poultry Federation at EPA–HQ–OAR–2012–0632–2429, and comments submitted by the Virginia Poultry Federation at EPA–HQ–OAR–2012–0632–2066.

[63] Durham, C., Davies, G., and Bhattacharyya, T., ''Can Biofuels Policy Work For Food Security? An Analytical Paper for Discussion,'' June 2012, available in the docket.

the RFS volume requirements and a waiver's impacts.

(a) Fuel Market Studies

Fuel market studies that focus on the impacts of an RFS waiver look at the economics of blended ethanol. Irwin and Good (University of Illinois) suggest that a waiver is likely to have little impact on the liquid fuel supply system. Their analysis rests on their observation that ethanol is currently the least expensive octane enhancer available, and that the current liquid fuel supply system in the U.S. has closely integrated ethanol use as a component to the finished gasoline supply. Alteration of ethanol's utilization would take time and require reallocation of infrastructure. Irwin and Good argue that even if a waiver is granted, only a combination of relatively high ethanol prices and low wholesale gasoline prices would change current gasoline and ethanol supply patterns. They estimate that gasoline prices would have to fall to roughly $69/barrel (West Texas Intermediate crude) before a shift would occur. Alternatively, corn prices, which are the key determinate of the price of ethanol, would have to rise on a sustained basis to over $10/bushel.

Carter, Smith, and Abu-Sneneh (University of California-Davis) present analysis using two different assumptions—one in which ethanol is priced in terms of its energy content, and one in which ethanol is priced on a volumetric basis. They suggest that the former is more likely, and that motorists realize the energy penalty associated with ethanol, but consumers do not have a choice but to accept the associated energy loss. If motor gasoline is valued for its energy content, they conclude that ultimately the RFS mandate is ''severely harming'' motorists. Their analysis suggests that, at current market prices, octane enhancement alternatives to ethanol would arise in the medium to long term without the RFS mandate if blended gasoline were valued based on energy content. They conclude that, if the mandate were eliminated, lower demand for ethanol would result in lower average corn prices by up to $0.87/bushel.[64] They estimate the ''harm'' from the conventional fuel RFS requirement to be roughly $2.9–$5.9 billion annually, which they claim could be higher if all the costs associated with the use of ethanol are accounted for. There are several limitations of their analysis, however. The authors acknowledge that their conclusions do not incorporate all of the costs of reduced ethanol usage. For example, many oil refiners move their products through common pipelines. Refiners need to coordinate with other users of the pipeline to ensure that a uniform product enters the pool. The coordination costs of lower ethanol usage are not estimated. Furthermore, this study does not provide sufficient data or analysis upon which we can evaluate their assertion that consumers are currently aware or modify behaviors in response to the energy penalty associated with ethanol. Despite the paper's conclusion that the RFS requirements should be waived, it is important to point out that their second scenarios supports our assessment that there would be ''no market response'' to a waiver if finished gasoline is priced on a volumetric basis. We discuss the basis for our ethanol demand assumptions above, and we did not see evidence presented in this study to change our reasoning with respect to how ethanol is priced.

A study published by EPRINC, while not attempting to quantify the impact of a waiver on corn prices, states that a long term waiver would likely reduce corn prices and ''could free over 18 millions of acres of existing farm land for the production of crops to meet market needs for food, livestock feed, exports, or fuel.'' [65] This study acknowledges, however, that a near term waiver (6 months to 1 year) would have little to no effect on corn demand for ethanol production.[66] In concluding that the RFS mandate increases corn costs by $0.87/bushel, Carter, Smith, and Abu-Sneneh (University of California-Davis) cite the EPRINC study when discussing the ability of refiners to decrease ethanol blending in the gasoline pool in the medium to long term. The studies here discuss the ability of refiners to decrease ethanol blending over the medium to long term, but they do not discuss whether the economics of ethanol and gasoline production would be such that there would be an economic incentive to do so. As discussed above, whether refiners would move away from ethanol blending if they had the opportunity to do so is influenced by a variety of factors, including economic ones. Examining the impacts of a medium to long term waiver is a significant distinction between these two studies and the analysis performed by EPA. EPA's authority is limited to granting a one year waiver, with potential for extending the waiver, a fact specifically noted by EPRINC.[67] For a further discussion of this issue see Section VI.7(b).

As discussed above, based upon a review of multiple external analyses including the studies cited above, consultation with DOE, and review of comments that we received, and given the circumstances and scenarios examined in our analysis, we believe that it would be highly unlikely that refiners and blenders would seek to replace ethanol in the time frame analyzed (i.e., one year) even if the RFS requirement were reduced or waived over the 2012/2013 corn marketing year. Ethanol blending is an economically beneficial option for refiners at this time, given the price of ethanol and the cost of production of finished gasoline. That is not expected to change during the time period at issue. In addition, even if it were economically advantageous to do so, previous investments that have been made to configure the fuel supply production and distribution systems (e.g., blending terminals) to incorporate ethanol are costs that have already been expended, and any change in utilization of these investments could take time and require reallocation of infrastructure. In addition, options or opportunities to make infrastructure changes may be technically and economically limited in the short term. Refiners are unlikely to make the changes to allow for reduced ethanol blending, such as modifying refining operations to produce higher octane blendstocks and draining storage tanks, if they do not believe these changes will be economically beneficial in the medium to long term, though this could differ in a scenario differing from that analyzed here with respect to oil prices, rollover RINs, and other key parameters. Fuel supply investments also tend to involve large capital expenditures. Fuel contractual obligations may be set over extended periods of time and could be difficult to alter in the short run (e.g., six months to a year). Also, the costs of using ethanol replacements, in terms of using different octane additives or even different sources of finished gasoline, including imports of finished gasoline to the U.S., would likely be significant in the near term.[68]

Further, assuming that U.S. agricultural markets return to pre-drought conditions in the following years (e.g., 2013/14 and beyond) and the blending of ethanol into the gasoline pool continues to be a profitable practice, it would not appear to be in a

[64] This result refers to removal of the RFS, not from a one-year waiver of the RFS requirements.

[65] EPA–HQ–OAR–2012–0632–2231.

[66] EPA–HQ–OAR–2012–0632–2231.

[67] EPA–HQ–OAR–2012–0632–2231.

[68] See Morgan Stanley, August 7, 2012.

refiner's economic interest to make changes in the fuel supply system. This would especially be the case if EPA were to not renew a waiver after one year, since refiners would need to quickly undo all of the changes they had just made in order to comply with the RFS in 2014. Carter, Smith, and Abu-Sneneh acknowledge the costs of switching back and forth to different levels of ethanol usage between 2013 and 2014 could be high.

EPA further received comment that the RFS is saturating the ethanol market in the U.S.; commenters point to the large corn ethanol exports in 2011 as evidence that blending ethanol into gasoline in the U.S. is not a profitable practice.[69] We do not agree that the significant corn ethanol exports in 2011 indicate that blending ethanol into gasoline was not profitable in the U.S. and driven by the RFS. In 2011 the blending of ethanol into gasoline exceeded the RFS mandates by a wide margin. The most likely reason for this is that refiners and blenders found the blending of ethanol to be a profitable practice. Low prices for corn ethanol RINs appear to support this. We believe the large volume of exported ethanol in 2011 is yet more evidence that, at least in 2011, ethanol production was the highest value use for corn. RINs for ethanol that is exported outside the U.S. must be retired when the fuel is exported; we therefore believe it is highly unlikely that the RFS program encouraged this practice and that converting corn into ethanol for export was simply more profitable than selling it into the food or feed markets.

Comments also cited work done by EPRINC that shows that increased ethanol blending has not lead to decreased crude oil imports, but only to changes in the end uses of the crude oil as evidence that waiving the RFS would lead directly to reduced corn ethanol production.[70] They cite the EPRINC study concluding that any decrease in ethanol blending could be made up for with additional gasoline from existing refineries without additional crude oil imports, but rather through shifting of refined crude oil products. While this may be the case we note that any increased gasoline production would correspond in a decrease in other refined products, most likely diesel fuel as noted in the EPRINC study. We believe that if these changes were profitable refiners would already be looking to minimize ethanol blending, which has not been the case in the past several years. We also note that the EPRINC study also states that a short term waiver would have little effect on corn demand for the production of ethanol.

(b) Agricultural Market Studies

Several studies focus on the agricultural sector impacts of a possible waiver of the RFS volume requirements. A number of these studies provide quantitative estimates of impacts of a waiver on corn prices and feed prices. Where commenters provided estimates of impacts to a State or a particular industry sector, such estimates were frequently based on results from the studies discussed below.[71] In many cases, the studies below present a range of estimates for impacts, and commenters cited estimates from both the low and, more frequently, the high ends of those ranges. In general, these agricultural sector studies are directionally consistent with EPA's analysis using the ISU model. In fact, the range of estimates provided in the Purdue/Farm Foundation study (described in more detail below), bracket the results that we present on the average impacts of a waiver and the impacts when the mandate is binding. Similarly, all of the referenced studies cite the importance of the same key assumptions that we have discussed previously, namely the amount of carryover RINs that are available and the degree of flexibility available to the refining industry over a one year period. As discussed further below, EPA believes that our technical analysis uses the most up-to-date data on available RINs and takes into account important information on refiner flexibility that these other studies treat only qualitatively or not at all.

FAPRI—Missouri finds that ethanol production falls by roughly 160 million gallons from eliminating the ''conventional gap'' which they define as ''the maximum amount of conventional (corn starch) ethanol that can be counted towards the mandate''. Less corn is needed to produce ethanol and, as a result, average corn prices decrease by roughly $0.04 cents per bushel. Lower average corn prices means lower feed costs for livestock producers, though the lower corn prices are partially offset by higher soybean meal and distillers grain prices. These feed price changes lead to an increase in net returns to meat production and, as a result, meat production increases and meat prices decrease. The FAPRI-Missouri results, like the EPA results presented above, predict a fairly modest impact on corn prices from a waiver of the 2013 conventional mandate.[72]

Babcock-Iowa State looks at the impacts of a waiver of the conventional fuel component of the RFS requirements under two cases: a ''full'' and a ''flexible'' mandate compared to a ''no mandate'' case. In the ''flexible'' mandate case, Babcock assumes that there are 2.4 billion rollover RINs for the 2012/2013 corn-marketing year. Comparing the ''full'' and the ''flexible'' mandates, average corn prices decrease significantly, by $1.91 per bushel. As discussed in the Babcock paper, the ''full'' mandate is not a realistic scenario, since it assumes there will not be any carryover RINs available in 2013. Based on the empirical RIN data discussed above, EPA is confident that there will be a significant number of carryover RINs in 2013 unless ethanol production changes drastically in November and December of 2012. Therefore, the ''full mandate'' results should only be considered as a bounding exercise. Comparing the ''flexible'' to the ''no'' mandate scenario, average corn prices decrease by roughly $0.58 per bushel across all runs—a decline of roughly 7.4 percent. By way of comparison, in the EPA analysis eliminating the RFS requirements would result in a decrease in average corn prices of roughly $0.07/bushel, on average across all runs.

One of the key differences between Babcock's results and the results presented in EPA's analysis above is how responsive ethanol demand is to the relative prices of unblended gasoline and ethanol. Babcock assumes that

[69] National Chicken Council comments, EPA–HQ–OAR–2012–0632–1994.

[70] EPA–HQ–OAR–2012–0632–1994.

[71] Comments submitted by, for example, the Virginia Poultry Federation and the North Carolina Poultry Federation included studies by FarmEcon LLC (Elam), which examined changes in feed prices and effects on revenue if corn prices were to decrease, due to a waiver, by $1.14 per bushel. The estimate of a $1.14 decrease is from the Purdue/Farm Foundation study. It is the difference in corn prices between a case with 13.8 billion gallons of corn ethanol production and a case with 10.8 billion gallons of production. For reasons discussed elsewhere (see, for example, sections V.1.e and V.2), we believe that ethanol production in the event of a waiver is unlikely to decline by 3 billion gallons. We also project that corn ethanol production in 2012/13 without a waiver is most likely to be around 12.48 billion gallons (see Section V.2), less than the projection used by FarmEcon LLC. See, for example analysis prepared for the North Carolina Poultry Federation at EPA–HQ–OAR–2012–0632–2429, and comments submitted by the Virginia Poultry Federation at EPA–HQ–OAR–2012–0632–2066.

[72] ''[R]educing the overall RFS has a small negative effect on the corn price in 2012/13 relative to the baseline because overall ethanol use and production are projected to be motivated mostly by crop and fuel market conditions in the current marketing year, not the RFS. Waiving the mandate, a minimum use requirement, has limited market impact if people were going to use almost as much as the mandate anyway.'' FAPRI-Missouri study at 1.

ethanol demand is more responsive to changes in prices, meaning his analysis assumes refiners and blenders have more flexibility to substitute away from ethanol in response to a waiver. In light of the limitations on refiner flexibility identified in Section V.1.d above, we believe that our assessment of refiner flexibility, performed in consultation with DOE, is a better reflection of current conditions. In addition, Babcock's analysis uses older WASDE data (which reflects larger uncertainties in corn yields) and older gasoline price data (in which the average gasoline price is lower than the October STEO).

The Purdue/Farm Foundation study looks at different levels of drought (e.g., a weak, median and strong drought) and different combinations of ethanol blending levels, which could be achieved either with a waiver or the use of conventional RINs (e.g., 11.8, 10.4 and 7.75 billions of gallons of ethanol). They conclude that if refiners and blenders have flexibility to reduce ethanol usage in the short term, use of prior blending RINs credits and/or a large waiver could reduce average corn prices by roughly $1.30/bushel of corn. Alternatively, a more modest waiver may reduce average corn prices by roughly $0.47/bushel of corn. As stated in the paper, results of the analysis are highly dependent upon how much flexibility is assumed to exist in the refining sector. Depending on the degree of refining and blending flexibility (and the severity of the drought), Purdue's ''range of corn price impacts from a partial waiver is zero to $1.30/bu.'' [73] Their results therefore ''bracket'' the results projected by the ISU model.

Similar to the Babcock-Iowa State study, a large part of the difference in the agricultural sector impacts (e.g., commodity price impacts) between the Purdue/Farm Foundation study and EPA's analysis is due to the responsiveness of ethanol demand to the relative prices of unblended gasoline and ethanol. Our review of multiple external analyses including the studies cited above in Section V.1.d, consultation with DOE, and review of comments that we received, suggests that ethanol demand, particularly in the short-run (i.e., the one-year, the 2012/2013 corn marketing time frame of a possible waiver) would be relatively unresponsive. Even if the U.S. fuel system could adjust and reconfigure to use less ethanol in the 2012/2013 time frame, the economic circumstances of ethanol and gasoline production are such that there would continue to be an economic incentive to blend ethanol into gasoline, particularly if the expectation is that drought conditions will subside and corn production in the U.S. will return to more typical (e.g., pre-drought) levels as early as the 2013/2014 corn marketing year.

For the reasons discussed above, we believe these external studies find potential impacts of the waiver that are similar in scope and direction as the analysis that EPA conducted. Whereas some of the external studies present a range of results from varying key assumptions, our analysis uses a stochastic approach to capture uncertainty in several key variables. Where a stochastic analysis was not possible (e.g., on the refinery flexibility issue our review of multiple external analyses including the studies cited above in Section V.1.d, consultation with DOE, and review of comments that we received, suggests that ethanol demand, particularly in the short-run (i.e., the one-year 2012/2013 corn marketing time frame of a possible waiver) would be relatively unresponsive. Other agricultural analysis primarily discussed this issue qualitatively.

Edgeworth Economics undertakes a scenario analysis to estimate the impacts on various sectors of the U.S. economy of a waiver of the RFS volume requirements. Based upon their review of recent studies (e.g., Babcock-Iowa State, Purdue/Farm Foundation) of the impacts of a waiver, Edgeworth Economics uses a decrease in average corn prices of roughly $0.52/bushel to estimate these impacts. They estimate that a waiver would decrease feed costs across the U.S. by roughly $3.1–$4.7 billion in the 2012/2013 crop marketing year. The low end of the range is based upon an assumption that other feed prices would not track the price of corn. Alternatively, corn growers would see a loss of revenues of roughly $5.8 billion if feed costs track the price of corn. Ethanol producers, faced with a corresponding loss in demand of roughly 950 million gallons of ethanol in the scenario, would see a decrease in revenues and co-product sales of roughly $2.9 billion. This finding with regards to corn prices and feed price impacts is consistent with our projection of the impact of the RFS program in the binding case. We project that, in cases where the conventional portion of the RFS requirements are binding, a waiver would reduce corn prices by $0.58/bushel and feed prices by approximately $3.6 billion nationwide. However, as stated above, we only project this outcome in 11 percent of cases, which are premised on the unrealistic view that gasoline prices and corn yields in 2012/2013 both fall significantly below their current DOE and USDA projections. Edgeworth Economics' projections are plausible only to the extent this would occur. Further, because the Edgeworth study is premised upon an averaging of the Babcock and Purdue/Farm Foundation results, it shares the limitations of those findings as well.

Cardno-ENTRIX evaluated two scenarios under a waiver: a ''low'' scenario in which ethanol production in 2013 is reduced by 500 million gallons, or 3.7 percent below 2012 levels, and a ''high'' scenario in which ethanol production in 2013 is reduced 1,425 million gallons or 10.5 percent from 2012 levels. In both scenarios, biodiesel production is reduced by 500 million gallons, or 50 percent below 2012 levels of production. These scenarios are patterned off of the results of recent analyses of RFS waiver impacts by Babcock-Iowa State University and Purdue/Farm Foundation. The reduction in biodiesel volumes makes the scenarios somewhat different. As did Purdue/Farm Foundation, Cardno-ENTRIX assumes that sufficient economic refiner flexibility exists to reach the volume of ethanol production assumed in each of their scenarios.

In the ''low scenario'', average corn prices fall by $0.46/bushel and average soybean prices fall by $0.74/bushel. In the ''high scenario'', average corn prices fall by $0.48/bushel and average soybean prices fall by $0.96/bushel. As a response of demand shifts in the corn market (i.e., less ethanol, more feed and exports), corn price declines are roughly similar in the ''low'' and the ''high'' scenarios. The ''low'' scenario is comparable to our projected outcome if the RFS program is binding. In that case, we project that ethanol production would decrease by approximately 414 million gallons, with corn prices decreasing $0.58/bushel. Much of the difference is attributable to differences in key assumptions. The Babcock paper from which Cardno-ENTRIX drew this estimate utilized earlier WASDE estimates and also used gasoline futures prices instead of STEO estimates. Inputs to that analysis also vary in terms of the economic value of ethanol to refiners, and under what circumstances refiners would shift away from ethanol. As discussed elsewhere in this decision in detail, our analysis with respect to the value of ethanol to refiners given current conditions led us to results that differ.

In both scenarios, increases in DDGS and soybean meal prices offset declines in corn and soybean prices with

[73] An updated version of this study is discussed below.

relatively minimal impacts on net feed ration costs. For example, in the ''low scenario'', there is a slight decrease in net feed costs for beef due to the relatively high share of feed costs for feeder cattle accounted for by corn grain. However, net feed costs for dairy cattle increase by more than four percent and net feed costs for swine, broilers and layers increase by less than one percent. Part of the reason for the livestock outcomes in this analysis is due to scenario design. A waiver that reduces biodiesel usage results in less soy meal production and increases feedstock costs. The reduction in soy meal offsets the livestock impacts of a waiver that only influences ethanol production.

Studies performed by FarmEcon LLC attempted to quantify the potential impacts of a waiver on poultry, dairy and hog producers in North Carolina and Virginia. Both studies cite the Purdue/Farm Foundation study as their source for the key analytical input of commodity prices; other commenters cited the Purdue/Farm Foundation study as well when presenting quantitative impacts.[74] In one of the studies, FarmEcon LLC uses a decrease in average corn prices of $1.14/bushel from the Purdue/Farm Foundation large waiver scenario to look at feed costs impacts for the dairy, poultry and hog producers in North Carolina. The corn price changes estimated by Purdue/Farm Foundation are higher than the change in corn prices we anticipate to result from a waiver for reasons discussed above. Using a larger change in corn prices, FarmEcon LLC estimates larger feed market impacts than we anticipate.

We also note that this analysis does not consider the effects of a waiver on distillers grains prices. To the extent that a waiver would reduce corn ethanol production (as it would to at least some extent in all three scenarios examined above), it would also reduce the supply of distillers grains. This increased scarcity of distillers grains would likely increase their price; at best prices would remain stable. To the extent that a waiver would lead to increased distillers grain prices, the projected reductions in feed costs detailed above would be mitigated.

Other studies submitted by commenters included work done by Babcock examining potential long-term impacts of the RFS program on the swine industry.[75] We do not respond to this study here as it is analyzing a set of issues outside the scope of the current decision. The DEFRA analysis does not contain sufficient detail with respect to methodology or analytical parameters to enable an evaluation of its results in the context of the current waiver requests. For example, DEFRA assess illustrative scenarios where a price spike is simulated by reducing the U.S. corn area harvested by 40 percent while maintaining the U.S. renewable mandate and ethanol blenders' subsidy in 2011. Various scenarios are simulated which waive an increasing share of the U.S. renewable fuel requirement, all while maintaining the ethanol blenders' subsidy. DEFRA finds that the larger the share of the mandate waived, the larger the price increases that are offset. The DEFRA study does not analyze impacts of a potential waiver under current conditions (e.g., with projected corn yields for the 2012/13 corn marketing year, elimination of the blenders' subsidy), and instead examines more generic consequences of a waiver for average corn prices.

5. Summary of the Technical Analysis

For the 2012/2013 corn marketing year, our analysis shows that it is very likely that the RFS volume requirements will have no impact on ethanol production volumes in the relevant time frame, and therefore no impact on corn, food, or fuel prices. In addition the body of the evidence also indicates that even in the unlikely event that the RFS requirements would have an impact on the corn and other markets during the 2012–2013 timeframe, it would have at most a limited impact on the food, feed, and fuel markets. The nature and magnitude of these projected impacts, which are not likely to occur, would not be characterized as severe. After reviewing the analysis and information submitted by commenters, including that discussed above, EPA continues to believe that the results of its modeling are the most reliable indicator of the likelihood that implementation of the RFS volume requirements will have an impact on the economy, and in the unlikely case that it would have an impact, the nature and magnitude of such impact.

6. Waiver Requests Related to Implementation of the RFS Biomass-Based Diesel and Advanced Biofuel Volume Requirements

EPA received several comments addressing issues related to a waiver of the biomass-based diesel (BBD) volume requirements. In general, the comments provided relatively little information or analysis on the relevant issues.

While few analyses and comments examined the issue of a BBD waiver, those that did focused on the impact on livestock and feed prices. The key price impact here is that of soybean meal, since this is the primary soy product fed to livestock. We are aware of two quantitative studies that projected price impacts on soybeans and soybean meal as a result of a possible BBD waiver, Babcock-Iowa State and Cardno-ENTRIX.[76] Babcock projects that a waiver of the BBD requirements might reduce soybean prices by $0.61 per bushel or about 3.5 percent (assuming that rollover RINs are available), but would also increase soybean meal prices by $22.00 per ton or about 4.2 percent. Cardno-ENTRIX finds, under an assumed 500 million gallon decrease in the BBD requirements, that soybean prices would decrease by $0.74 per bushel or 4.5 percent, while soybean meal prices would increase by $32.96 per ton or about 6.7 percent. Because most livestock are fed soybean meal, not whole soybeans, these projections would mean that a waiver of the BBD volumes would very likely increase feed costs.[77] This would mean that waiving the BBD requirements would likely exacerbate the impacts that the drought has had on feed prices. It is likely that waiving any portion of the BBD requirements would cause more economic harm than it would alleviate in food and feed markets. Given this,

[74] Quantitative analysis presented in comments by the National Chicken Council, for example, uses estimates from an updated version of the Purdue/Farm Foundation study, EPA–HQ–OAR–2012–0632–1994. At the request of the National Chicken Council, the authors of this study applied September WASDE data to the same methodology, providing new results. The National Chicken Council refers to a projected change in corn prices of $2.00/bushel as a result of a waiver. The authors of this study projected that change assuming that ethanol production dropped from 13.8 billion gallons without a waiver to 7.75 billion gallons with a waiver. As we detail in our discussion of Elam, we do not agree with the estimate that 13.8 billion gallons of ethanol would be produced in 2013 with RFS requirements in place. Further, as we detail in our discussion of the Purdue/Farm Foundation study, the assumption that ethanol consumption by the refining sector could fall by roughly 6 billion gallons within the space of one year does not reflect our assessment of limits on refiner flexibility.

[75] ''Iowa State Analysis for 2015–2020/Analysis of Ethanol and Corn Market and the Impact on the Swine Industry,'' submitted in comments by the National Pork Producers Council, EPA–HQ–OAR–2012–0632–2209.

[76] Most of the studies examined in this determination, including those by Purdue/Farm Foundation, Irwin and Good, and Edgeworth Economics (all discussed elsewhere in this notice), focus only on the impacts of corn ethanol. FAPRI-Missouri provides estimated impacts of a biodiesel waiver on soybean prices, but does not provide estimated impacts for key soybean products (i.e., soybean meal). For this reason, this paper's estimates for soybeans are of limited usefulness in the context of feed costs.

[77] EPA received comment on this topic from various soybean-related parties, including, for example, the Illinois Soybean Association and Minnesota Soybean Processors (CITE).

and in light of the fact that the few commenters who asked us to consider a biodiesel waiver focused on the impacts on livestock costs, we do not believe that an EPA analysis similar to our examination of corn ethanol is merited. In addition, EPA concludes that the evidence does not support a determination that implementation of the RFS BBD volume requirements would severely harm the economy and a waiver would therefore not be appropriate.

Similarly, we have not conducted a technical analysis of the potential impacts of waiving the advanced renewable fuel standard, since a majority of the advanced standard is expected to be met with biomass-based diesel in the 2012/2013 corn marketing year. Finally, we have not analyzed the impacts of waiving the cellulosic renewable fuel standard in 2012/2013, since we did not receive any specific information or rationale concerning a possible justification for waiving the cellulosic volumes. In addition, the cellulosic volume requirement for 2013 is likely to be relatively small and production volumes unlikely to be affected by the drought due to their sources of feedstock.

VI. Other Issues

EPA received comment on several areas of concern in addition to the economic impact of implementation of the RFS volume requirements. Comments addressed, among other things, overall U.S. policy on biofuels and the RFS; the environmental impacts of renewable fuels in general and the RFS program in particular; the impact of granting a waiver on the future of ethanol production in the U.S.; the characteristics, favorable or otherwise, of ethanol as a transportation fuel; and EPA's interpretation of section 211(o)(7) of the Act. Although this section summarizes and provides general responses to some of the more the more frequently raised comments that are unrelated to the economic impact of implementing the RFS, EPA notes that these issues generally were not relevant to EPA's consideration of the current waiver request. While EPA has broad discretion to consider such issues in determining whether or not to grant a waiver if it finds that implementation of the RFS would severely harm the economy of a State, region or the U.S., these issues are not relevant to EPA's decision where, as here, EPA is denying the waiver requests because the evidence and information does not support a determination that the statutory criteria for granting a waiver are satisfied.

1. Impacts on Corn Prices From Increasing Renewable Fuel Production

EPA received many comments discussing the impact of increasing renewable fuel production over time on crop and feed prices, and on the economic consequences of increasing prices on various sectors, including the livestock, poultry, dairy, various food-related industries, and segments of the population.[78] Multiple commenters argued that the rise of corn prices over the past several years has coincided with and is in substantial part a result of the increasing renewable fuel volumes required under the RFS program. Commenters state that the consequences of this dynamic include tighter global corn supplies, a more volatile commodity market, and higher costs for various sectors of the economy as the prices of a key input, corn, have risen. A number of the requesting States and many commenters state that higher corn prices caused in part by increased demand from the RFS program have had significant negative effects on the livestock, poultry, and dairy industries due to the rising costs of feed. Other commenters focus on the link between higher prices for corn or other food commodities and increased prices of food for consumers. Some of these comments cite analysis conducted by various individuals or organizations estimating the portion of the increase in corn prices over a period of time that is attributable to increased renewable fuel use, or the impact of rising corn prices on consumer food items.

EPA acknowledges the linkages between corn prices, feed prices, costs to the livestock, poultry, and dairy industries, as well as impacts on food prices; the analysis presented above explicitly examines these connections. At the same time, and as many commenters also point out, the market price of corn is influenced by a variety of factors, including among other things macroeconomic factors like oil prices, international demand for coarse grains, crop production in different corn-growing countries, fertilizer costs, and weather conditions that affect crop production levels. As many of the requesting State letters point out, and as we discuss in the Executive Summary, this year's severe drought has had a significant impact on the recent increase in corn prices.[79]

As mentioned above we fully recognize the toll this year's drought has taken on multiple sectors of the economy, and we have reviewed comments submitted to us in detail. While we generally agree that the issues raised by commenters are important considerations, as discussed previously, the issue before EPA is a narrow one—whether implementation of the RFS volume requirements over the time period at issue would severely harm the economy. The historical impacts of overall production and use of biofuels in the U.S. is not the relevant issue for purposes of determining whether implementing the RFS would severely harm the economy of a State, region or the U.S. over the time period of concern.

2. Overall U.S. Policy on Renewable Fuels

EPA also received comments from various individuals and organizations critical of the broader RFS program and policies that promote renewable fuels in general. Some commenters raise the potential negative environmental consequences of renewable fuels, including impacts on wildlife habitat due to renewable fuel policy, and the potential for increased greenhouse gas emissions from land use changes connected to renewable fuel policy.[80] Others focus on the impacts that the RFS and other renewable fuel policies can have on international commodity markets, effects of price changes in developing countries, volatility in agricultural prices, and effects on domestic consumers, and argue that a waiver of RFS requirements would help to begin addressing such negative impacts. Some commenters either cited or submitted a study by Dr. Thomas Elam of FarmEcon LLC presenting a fairly comprehensive assessment of the RFS program, its impact on the agricultural sector, fuel markets, and global commodity markets, and proposals for statutory modifications.[81]

EPA considers these important topics and has reviewed such comments in detail. However, the question before us is fairly narrow. EPA received requests for a waiver under a specific provision of law and our decision in response to those requests is necessarily based on our authority under that provision. EPA

[78] Examples include petitions and/or comments submitted by various requesting States and by individuals and organizations associated with the livestock, poultry, and dairy industries.

[79] See, for example, August 13, 2012 letter from the Governor of Arkansas, EPA–HQ–OAR–2012–002. ''Virtually all of Arkansas is suffering from severe, extreme, or exceptional drought conditions. The declining outlook for this year's corn crop and accelerating prices for corn and other grains are having a severe economic impact on the State.''

[80] See for example comment submitted by Bullock et al., EPA–HQ–OAR–2012–0635–1707.

[81] See Dr. Thomas Elam, FarmEcon LLC, ''The RFS, Fuel and Food Prices, and the Need for Statutory Flexibility,'' July 16, 2012, submitted with comments from the National Chicken Council, EPA–HQ–OAR–2012–0632–1994.

April 29, 2013

To: The Honorable Fred Upton, US House of Representatives, Chairman, Committee on Energy and Commerce
The Honorable Henry Waxman, US House of Representatives, Ranking Member, Committee on Energy and Commerce

From: Bill Lapp, President, Advanced Economic Solutions, Omaha, NE

RENEWABLE FUEL STANDARD ASSESSMENT WHITE PAPER – Agricultural Sector Impacts
The House of Representatives Committee on Energy and Commerce
Request for Comments

This letter is written response to your second RFS White Paper, "Agricultural Sector Impacts", and the Questions for Stakeholder Comment.

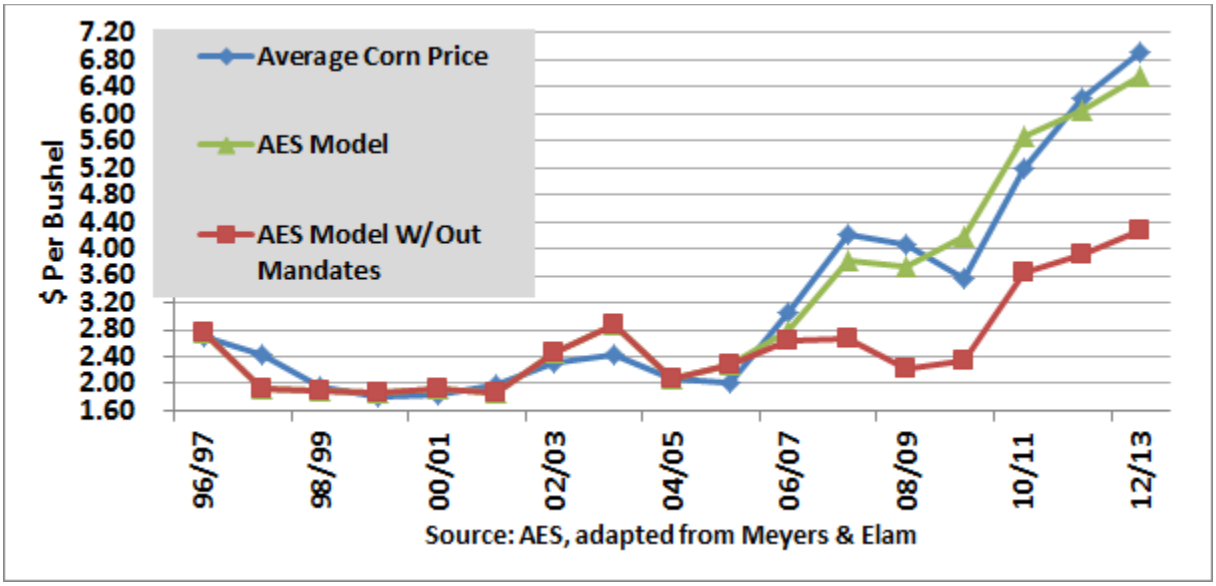
I am responding on behalf of Advanced Economic Solutions (AES), an economic and commodity consulting firm, primarily serving restaurant chains and food manufacturers. Clients of AES purchase over $10 B of inputs annually, and thus AES is very interested in the impact of the RFS upon the price of their inputs.

The RFS has had a significant impact upon the cost of inputs paid by restaurants and food manufacturers since its inception. The negative repercussions have been of great consequence to the consumer price of food, both in the US and globally. My comments will focus on three questions (#1, #3, and #5).

<u>Question 1</u> - *What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?*

Corn prices (average farm) are forecast to average $6.90 per bushel during 2012/13, up from $6.22 during 2011/12. This is a more than double the average during 2006/07 of $3.04[1]. Drought during 2012 has impacted prices, but the RFS has been an important driver of higher corn prices since 2007.

Advanced Economic Solutions estimates corn prices since 2007 have been 59% higher than they would have been without the RFS. This is based upon a model developed by Advanced Economic Solutions (adapted from the research of Drs. Thomas Elam and Steve Meyer). The model incorporates traditional variables (stocks-use ratios and the price of crude oil) as well as non-traditional variables relating to the RFS (i.e., the level of the RFS corn-based ethanol mandate).



Corn used to produce ethanol has increased from 2.1 B bushels (19% of total use) during 2006/07, to 4.55 B bushels (41% of total use) during 2012/13, a gain of 115%[2]. The use of corn for all other purposes has declined by 27%, as ethanol mandates have "crowded out" all other demand. Declining corn exports provide clear evidence of "crowding out" – US corn exports have declined by 62% over this period (from 2.1 B bushels to 0.8 B bushels), with the US share of world corn trade declining to the lowest level in more than 50 years.

As more corn has been used for ethanol production and corn prices have risen, the price and availability of other crops (including soybeans) has been dramatically impacted. Corn is far and away the dominant crop in the US – the volume of corn produced annually in the US is greater than all other crops planted each year[3]. "When corn sneezes, other crops catch a cold".

Between 2006 and 2012, corn acreage has increased by 19 mm acres (24%), while all other principle crops have declined by 13 mm acres (5%). As a result the price of other major crops has increased dramatically, including soybeans (+122%), wheat (+83%), cotton (+49%) and rice (+50%)[4].

---

[1] USDA Economic Research Service
[2] USDA Economic Research Service; USDA World Agricultural Supply/Demand, April 2013
[3] USDA National Agricultural Statistics Service
[4] USDA National Agricultural Statistics Service

<u>Question 3</u> - *Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?*

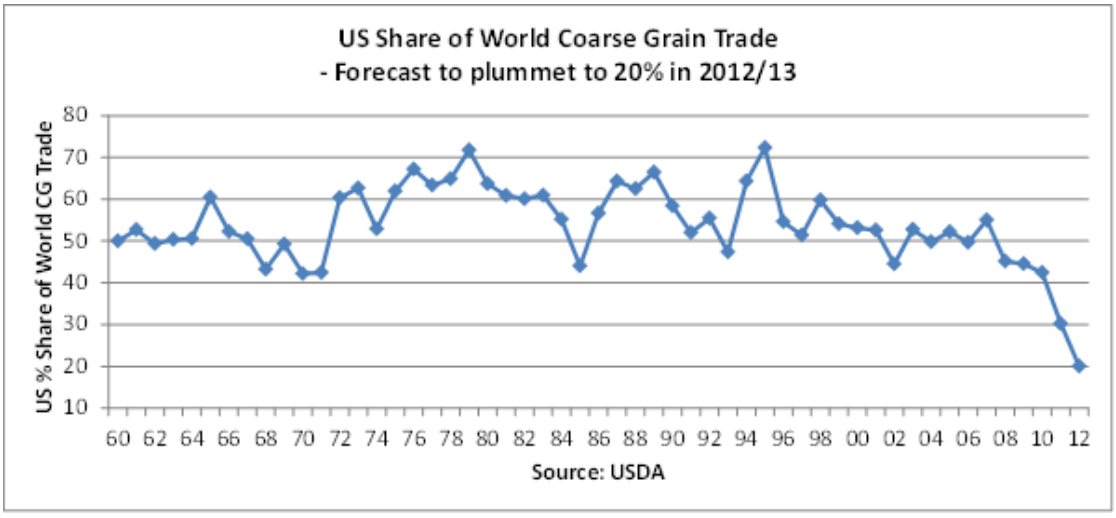
In my judgment, the EPA was not correct to deny the waiver request. The EPA waiver request was made in response to a sharp reduction in 2012 US corn production – corn production declined 13% from a year earlier, driven by arguably the sharpest decline in US corn yields (relative to trend) since 1988. With stocks declining to the lowest level in 15 years and corn prices rising to record levels, it is hard to imagine what sort of extreme situation would be required to compel EPA to agree to a waiver request.

Ignoring the request has resulted in unwarranted and avoidable financial hardship for livestock and dairy producers, as well as a sharp curtailment in US corn exports. Had the EPA chosen to accept the waiver request, the adverse consequences for the US livestock industry and corn export markets could have been largely averted.

The consequence of the waiver denial for livestock producers has been a financial train-wreck. Corn prices have risen dramatically and will be record high during the current 2012/13 crop year. Feed use of corn represents the second largest component of US corn demand (after ethanol). Each of the major livestock sectors – beef, pork, poultry, dairy and eggs – relies upon corn as the primary carbohydrate used in feed rations. With record high feed costs, each of the livestock sectors has been incurring sizable losses, and is in the midst of contracting supplies in response. Because these industries cannot not change production plans in a timely fashion, livestock producers are forced to endure negative margins for an extended period of time.

The EPA denial of the waiver request has also resulted in reduced supplies of corn available for exports. US corn exports during 2012/13 are forecast to decline to 800 mm bushels, off nearly 50% from a year earlier[5]. The US share of world trade has ranged from 40% to 70% over the past 50 years, but is forecast to decline to 20% during 2012/13. Traditional customers have reduced purchases of US corn dramatically, including Japan (-57%) and South Korea (-90%)[6]. The US is being replaced by more reliable exporting countries such as Brazil, which is close to surpassing the US in corn exports this year.

It is noteworthy that the loss of corn exports is important to the US trade balance – US corn exports have contributed between $9 B and $14 B annually during the previous five years toward narrowing of the trade deficit.



[5] USDA World Agricultural Supply/Demand, April 2013
[6] USDA Foreign Agricultural Service

Question 5 - ***What has been the impact, if any, of the RFS on food prices?***

Advanced Economic Solutions estimates that the cost of food for US consumers during 2007-12 was 17% higher (2.8% annually) than it would have been without the corn-based ethanol mandates in the RFS.

The RFS has increased the price of corn by an estimated 59% during 2007-12, based upon research by Advanced Economic Solutions. The impact upon food prices from the RFS manifests itself in two ways

- Higher corn prices driving up the cost of other crops that must compete with corn for those acres, and
- Higher corn prices means higher feed costs for livestock and dairy producers, ultimately driving up the price of beef, pork, chicken, turkey, milk and eggs

These impacts have lags, and are not always easy to discern. However the increased costs incurred by livestock producers, food manufacturers and restaurants is ultimately passed on to consumers.

Advanced Economic Solutions estimates that with no mandates and lower corn prices, the cost of grain consumed plus corn for the feeding of livestock producers would have been $125 B lower during the past six years (2007-12)[7]. Based upon the Bureau of Labor Statistics Consumer Expenditure Survey, this equates to a total increase of 17% in consumer food expenditures during 2007-12 – 2.8% annually[8].

Soyoil costs, relating to the biodiesel and total advanced biofuel mandate, have a direct and nearly immediate impact upon the cost of food for consumers. US consumption of vegoil totals over 25 B pounds per year, with soyoil representing a majority of the total. Mandates for biodiesel and advanced biofuels likely have increased the cost to US consumers by more than $1 B during 2012. Looking ahead, the rising mandates represent a sizable upside risk (and ultimately a liability for consumers) if biodiesel is forced to rise sharply to meet the advanced biofuel mandates.

Globally, food prices have likely been impacted as well. The United Nations FAO Food Price Index has risen 68% since 2006, including a doubling of cereal prices. It is important to consider the extent to which the RFS may have caused food prices increases in the poorer countries of the world.

[7] Advanced Economic Research, unpublished
[8] Bureau of Labor Statistics "Consumer Expenditure Survey"

aec
ADVANCED ETHANOL COUNCIL

April 29, 2013

The Honorable Fred Upton
Chairman, Committee on Energy and Commerce
U.S. House of Representatives

The Honorable Henry Waxman
Ranking Member, Committee on Energy and Commerce
U.S. House of Representatives

RE: AEC Comments on the RFS Assessment White Paper: Agricultural Sector Impacts

Dear Chairman Upton and Ranking Member Waxman,

The Advanced Ethanol Council (AEC) appreciates the opportunity to comment on the Renewable Fuel Standard Assessment White Paper: Agricultural Sector Impacts. The AEC represents worldwide leaders in the effort to develop and commercialize the next generation of ethanol fuels, ranging from cellulosic ethanol made from dedicated energy crops, forest residues and agricultural waste to advanced ethanol made from municipal solid waste, algae and other feedstocks. The AEC is the only advanced biofuel group with the singular purpose of promoting advanced ethanol fuels and technologies.

General Comments on the RFS: As discussed in prior comments submitted as part of the white paper process, it is important to consider why the Renewable Fuel Standard (RFS) is necessary as an underlying component of any review of the program. If you investigate the history of ethanol use in the United States, it becomes evident that the U.S. liquid fuels industry is not price driven, open or competitive. In a competitive marketplace, if an innovator presents a valuable product for a competitive price, there is a reasonable expectation of demand. This free market principle gives investors a durable benchmark against which to judge the value of their product, which in turn attracts investment to better products. This important market dynamic is largely absent from the global liquid fuels marketplace for a number of reasons, including but not limited to the highly consolidated, vertically integrated characteristics of the oil industry, particularly with regard to wholesale markets, the anti-competitive price distorting behavior of OPEC, and blending constraints such as the blend wall. There is no better example of the consequence of this problem than ethanol, which has generally been offered at a significant discount to gasoline without increased demand significantly beyond the volume of fuel required for blending by the U.S. government.[1] With specific regard to the advanced biofuels industry, it is important to emphasize

[1] Some have argued that this discount reflects the lower energy density of ethanol relative to gasoline. This is a misleading argument, because ethanol also contains much higher octane (with lower toxicity) than gasoline, which puts ethanol in a much more expensive class of premium fuel products that are relied upon to meet the minimum performance and environmental standards for gasoline. It is not a coincidence that the primary alternatives to ethanol for octane trade at prices that often exceed $5.00 per gallon.

that one of the primary problems with a non-competitive marketplace is its failure to properly reward innovation. In other words, if the market does not necessarily demand a better and cheaper product, then there is no impetus to create one (both from within and outside of the fossil fuel sector). This is one of the primary reasons why the United States remains largely dependent on petroleum to meet consumer demand for liquid fuels. It is also the overarching reason why the RFS is necessary. The RFS provides innovators with a predictable (and flexible) expectation for demand in a marketplace that does not properly reward innovation. Most importantly, the RFS is working. The RFS statutory schedule required 15.2 billion gallons of renewable fuel blending in 2012, of which 2 billion were advanced biofuels. The renewable fuels industry met the challenge. Just five years after the enactment of RFS2, the cellulosic biofuels industry is breaking through at commercial scale (see attached: AEC Cellulosic Biofuels Progress Report).[2] Given the realities of world and domestic liquid fuels markets, the cornerstone of ongoing investment and development in the advanced biofuels sector is the consistent, unchanged and durable administration of the RFS. The alternative to the RFS – or any gallons waived from the RFS – is not innovation in other areas; it is simply more fossil fuels that are increasingly scarce and carbon intensive.

General Comments on the Agricultural Impacts of the RFS: While the AEC represents companies making ethanol from second generation feedstocks, the Council has been engaged in the RFS/food/agriculture debate at virtually every level given its implications for the industry and the policy as a whole. Generally speaking, we see the debate breaking down this way:

1. <u>There is general consensus that the RFS has created jobs and economic development in the United States.</u> There are two primary interest groups putting forth the argument that the RFS is causing unintended consequences in the agricultural sector: the oil industry and the livestock industry. Neither of these sectors tends to challenge the argument that the RFS has created domestic jobs and economic development, whether related to the hundreds of thousands of jobs generated or the economic development benefits of making and selling renewable fuel to American consumers. For example, a recent article by several analysts from the Oak Ridge National Laboratory found that the RFS is producing significant positive economic effects ("the net global economic effects of the RFS2 policy are positive with an increase of 0.8% in U.S. gross domestic product (GDP) in 2022…[well in excess of $100 billion]" stemming from the fact that the RFS is reducing crude oil prices, decreasing crude oil imports, increasing gross domestic product (GDP), and having only minimal impacts on global food markets and land use.[3] The Congressional Research Service (CRS), the Department of Energy (DOE), the Department of Agriculture (USDA), the Environmental Protection Agency (EPA), and numerous U.S. national laboratories have conducted detailed analysis of the impact of the RFS on the agricultural

[2] See AEC Progress report, http://ethanolrfa.3cdn.net/96a2f9e04eb357bbbd_1sm6vadqk.pdf.
[3] See http://www.future-science.com/doi/abs/10.4155/bfs.12.60?journalCode=bfs.

sector, and generally conclude that the RFS has had a positive impact on jobs and economic output, especially in Rural America.

2. There is general consensus that agricultural commodity and feed prices have increased during the last decade, and higher feed prices bite into the bottom line of livestock producers. Any basic analysis of agricultural markets will show that grain prices have increased over the past decade, and that input costs have therefore increased for livestock producers. Of course, input costs have also increased for biofuel producers. But generally, it is true that global markets have reached a new equilibrium when it comes to agricultural (and oil) commodity prices.

3. There is **not** general consensus around what is causing higher agricultural commodity prices. Opponents of the RFS have done a good job of creating and leveraging the intuitive link between using more agricultural products (for energy) and food/feed price increases, but a basic literature review on the subject raises questions about the argument. The AEC generally welcomes a review of the literature on this subject, because we believe there is overwhelming support for the argument that the RFS is not driving agricultural commodity prices. See below for a detailed analysis.

4. There is **not** general consensus that higher agricultural commodity prices have a significant impact on food prices, or that food prices are even increasing. While opponents of the RFS continue to make the argument that food prices are increasing as a result of the RFS, empirical evidence suggests that food prices are not greatly impacted by higher agricultural commodity prices (because such a small percentage of the cost of food is attributable to the farm), and are not in fact increasing at all when looking at food index trends over time (see below).

5. There is very little recognition of the baseline when it comes to the production of agricultural commodities in this country, and how livestock benefited from farm subsidies over time. When the livestock industry argues that the RFS is increasing the market price for feed, the underlying presumption is that grain/feed markets were relatively balanced and functioning effectively before the imposition of the RFS. This is untrue. As detailed in a Tufts University report, what was actually happening was the U.S. livestock industry was benefiting from a distorted marketplace in which U.S. taxpayers and farmers were subsidizing down the price of corn/soybean feed to price levels that were often less than the cost of production.[4] Put another way, U.S. farm policy encouraged U.S. farmers to grow more corn and soybeans, which in turn led to an over supplied marketplace and drove down price (often to below cost levels for corn and soybeans). The U.S. government intervened to repay some of the balance to farmers via

[4] See http://www.ase.tufts.edu/gdae/Pubs/rp/PB07-03FeedingAtTroughDec07.pdf.

subsidy (i.e. farm income still decreased during this time), but U.S. livestock profited handsomely from below cost, indirectly subsidized feed grain. The report states:

> *Critics argue that in the "food vs. fuel" fight choosing fuel will lead to rising retail food prices, particularly for meat and dairy products. The nation's largest meat companies are some of the most vocal critics … these same livestock giants, not farmers, have been among the main beneficiaries of U.S. farm policies since 1996 … Farm subsidies made up only a share of the difference; farm families made up most of the rest with off-farm income. While family farmers' net incomes stagnated or declined, even with subsidies included, industrial livestock operations were treated to a bonanza of low-priced feed.*
>
> - *Excerpted from Feeding at the Trough, Tufts University, 2007*

To be clear, the AEC does not intend to belittle the impact of higher feed prices on livestock producers. They are real, and the biofuels industry has also experienced increasing input costs. However, because we do not believe that the RFS is driving higher feed prices, we believe that the livestock industry's attacks on the RFS are misplaced. And, to the extent that policymakers are concerned that new policy (or other) forces have changed grain-to-feed economics, it is important to consider the actual characteristics of the marketplace before it changed.

Please find below responses to the specific questions outlined by the Committee:

1. <u>What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?</u>

The AEC represents companies that are producing advanced biofuels from feedstocks other than corn starch, and therefore would like to offer only general suggestions to the Committee on this issue. First, there are at least a couple dozen assessments of the impact of the RFS on commodity prices. We encourage the Committee to focus on both the depth of analysis and the source of funding. There are some studies of very low quality in the space to contrast with many from reputable and/or independent academic or research entities. Second, to date, the predominant fuel driven by the RFS is corn ethanol, and industry capacity is almost at the 15 billion gallon per year maximum legislated blending requirement for corn ethanol. So with corn ethanol almost at RFS capacity, production of the fuel still only utilizes 3% of the world's grain supply. It is difficult to see how the 3% annual utilization rate is driving the price of the other 97% of the world grain harvest. Either way, future RFS volumetric requirements are comprised predominantly of advanced biofuels made from second generation feedstocks. Third, there are many times in the last 5 years – and particularly between April 2008 and early 2010 – during which the price of corn decreased markedly while ethanol production continued to increase. This break in (directional) correlation raises questions about the causal link between the RFS/ethanol and corn prices, especially in contrast to the other drivers (i.e. the price of oil) that actually correlated with corn prices during those time periods.

2. How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?

As discussed above, there is general consensus that the RFS has created jobs and economic development in the United States. We are through roughly one-third of RFS2 schedule (i.e. 5 of the 15 year commitment), and there are multiple studies showing a range of economic impacts. For example, a recent state-by-state analysis conducted by Cardno ENTRIX (commissioned by RFA) concluded that the ethanol industry alone supports roughly 383,000 direct and indirect jobs across all sectors, and contributed $43.3 billion to GDP and $30.2 billion in household income.[5] A recent article published by several analysts from the Oak Ridge National Laboratory found that the RFS is producing significant positive economic effects ("the net global economic effects of the RFS2 policy are positive with an increase of 0.8% in U.S. gross domestic product (GDP) in 2022…[well in excess of $100 billion]" stemming from the fact that the RFS is reducing crude oil prices, decreasing crude oil imports, increasing gross domestic product (GDP), and having only minimal impacts on global food markets and land use.[6] As discussed in the Oak Ridge report, producing domestic renewable fuels has increased economic output in and of itself, but especially when taken against the alternative of gasoline (which results in a net exportation of jobs and capital on an industry-wide, per gallon basis given the inherently foreign characteristics of the industry, even today).

3. Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

Yes. There are a number of reasons why EPA was correct in denying the 2012 waiver request, ranging from the fact that ethanol consumes just 3% of the world's grains (which have been historically over, not under produced in this country and many others, which depresses pricing and forces government intervention) to the reality that petitioners fell well short of providing factual support for their allegations of economic harm. But one factor too often overlooked in the context of the 2012 waiver question is the fact that the RFS was engineered to allow for an unpredictable marketplace. As discussed below, obligated parties (oil companies) are permitted to carry forward up to 20% of their obligation from year to year at their own discretion. This means that there is an automatic 20% elasticity in the compliance obligation from year to year, which in turn allows oil companies to avoid buying billions of wet gallons of renewable fuels per year when and if they see fit. While this allowance creates uncertainty for the renewable fuels industry, it is one of the primary reasons that the drought-related waiver request was denied by EPA in 2012 – i.e. by law, the waiver must have a mitigative effect on the harm alleged, but because flexibility in the RFS was already working to alleviate pressure on corn

[5] See http://ethanolrfa.org/page/-/rfa-association-site/studies/2012%20Ethanol%20Economic%20Impact_By%20State.pdf?nocdn=1.
[6] See http://www.future-science.com/doi/abs/10.4155/bfs.12.60?journalCode=bfs.

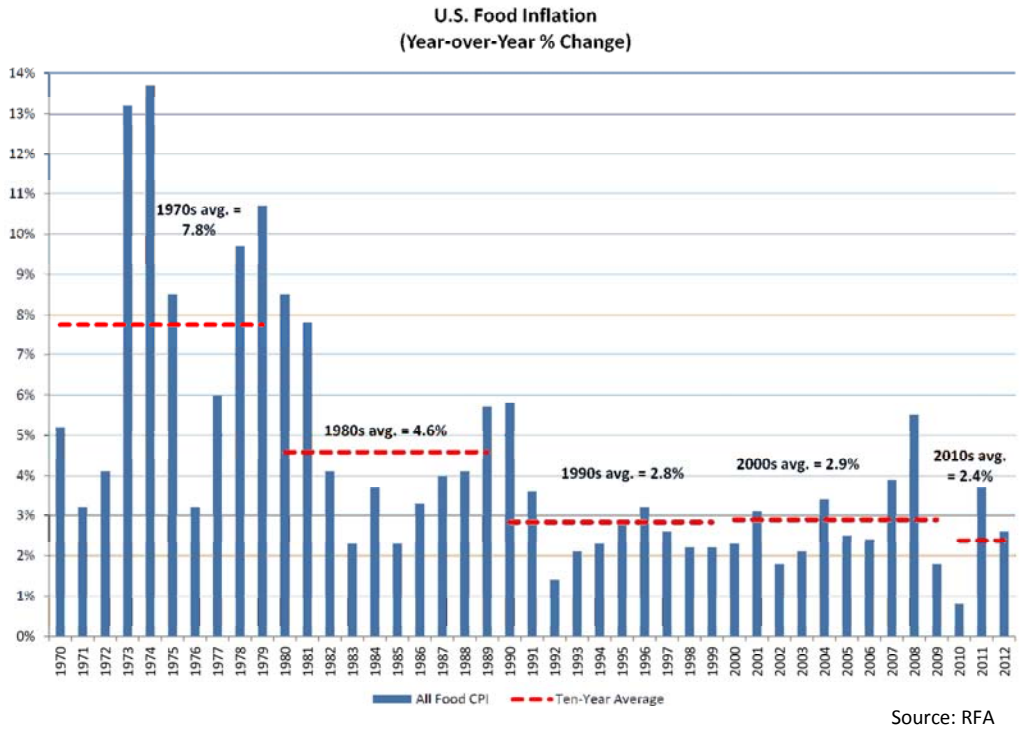
markets (by allowing decreased demand for corn ethanol), EPA found that additional incremental moves like waiving RFS gallons would have had little, if any, mitigative effect on agricultural prices. Indeed, if you look at ethanol market trends in 2012, you will see a distinct decrease in ethanol demand. This is the RFS and market working in response to unforeseen circumstances without the need for legislative change or an administrative waiver.

4. Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

Yes. The flexibility provisions are not only already contained in the CAA/RFS, but EPA is utilizing them as part of their responsible administration of the RFS. This aspect of the RFS (as codified in the CAA) is not well understood. First, there is built in flexibility that is available to all obligated parties on a year-to-year basis without the need for intervention by EPA. The most important built in flexibility provision is the allowance for obligated parties to carry forward up to 20% of their obligation from year to year. As discussed above, this means that there is an automatic 20% elasticity in the compliance obligation from year to year, which in turn allows oil companies to avoid buying billions of wet gallons of renewable fuels per year when and if they see fit. While this allowance creates uncertainty for the renewable fuels industry, it is one of the primary reasons that the drought-related waiver request was denied by EPA in 2012 – i.e. the built in flexibility in the program was already working to alleviate pressure on corn markets and therefore additional incremental moves like waiving RFS gallons would have had little, if any, mitigative effect on agricultural prices. There are a number of other very important flexibility provisions contained in the RFS. With regard to cellulosic biofuels, EPA has the authority to waive up to 100% of the requirement if the fuel is not available. Much has been made of alleged requirement to blend non-existent fuel, but the fact is that EPA has waived more than 97% of the obligation on oil companies to blend cellulosic biofuels. Recently, a U.S. District Court of Appeals clarified EPA's discretion with regard to cellulosic biofuels as it applied to the 2012 RFS volumetric requirements, and EPA responded by *voluntarily* remanding earlier year targets to reflect the January 2013 ruling. Generally, the statute provides EPA with waiver authority for situations in which the RFS would "severely harm" the economy or environment, or for when there are supply issues. EPA's waiver authority, taken together with the year-to-year flexibility built into the compliance program, more than adequately addresses the full spectrum of possible uncertainties that could emerge in the marketplace.

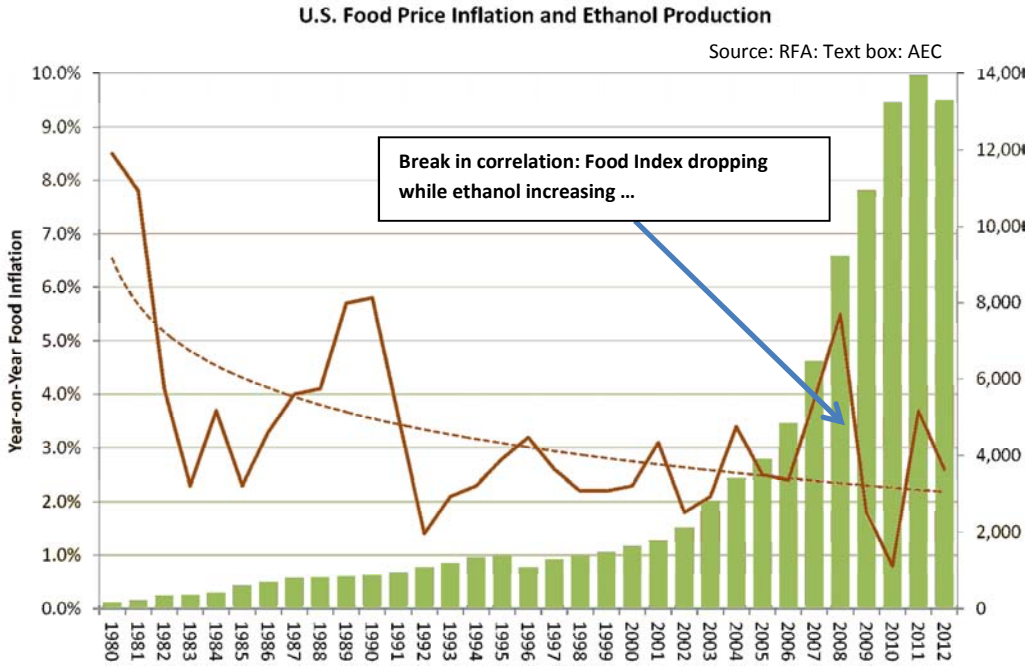
5. What has been the impact, if any, of the RFS on food prices?

One of the most unsupportable arguments offered by opponents of the RFS is that the program increases food prices. First, food prices are not increasing as a general trend (see below). Food prices rose 1.8% in 2012, the second-lowest annual rate in the last 20 years.

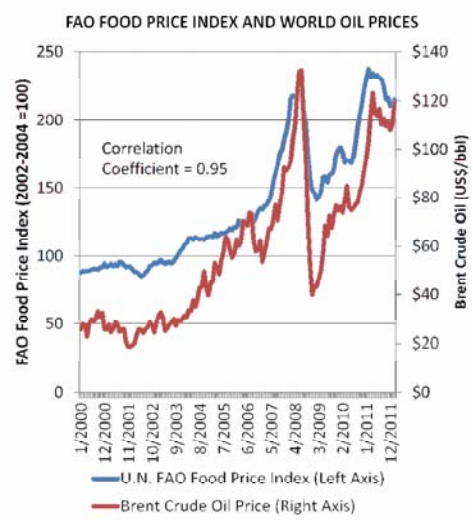


Source: RFA

Second, the correlative logic behind the argument that the RFS is increasing food prices has fallen apart several times over the last five years. For example, in 2009, ethanol production and use continued to increase sharply while the food index decreased dramatically (see below). It is difficult to argue that ethanol is the cause of food price increases in the absence of correlation.



Finally, while there is no correlation between ethanol and the food price index, there is a strong correlation between oil prices and the food index. This strongly suggests that oil prices are driving food prices, which makes sense given the impact of higher oil prices on virtually every aspect of our economy. It is also suggests that the RFS – given its reductive effect on fuel energy pricing – is part of the solution to food price spikes rather than part of the problem.



6. What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?

The RFS was not designed to displace the production and use of corn ethanol with cellulosic biofuels; rather, it was designed to facilitate the production and use of a certain and reasonable amount of corn ethanol (15 bgy) and advanced biofuels (21 bgy) to mitigate the very clear deleterious economic and environmental effects of producing and using oil. It is important to remember that the RFS schedule itself does not require more than 15 bgy of corn ethanol use, and the industry has almost reached this capacity. The commercialization of cellulosic biofuels will allow the renewable fuels industry to continue to grow (creating jobs and economic output) to meet the RFS without putting more pressure on the feedstocks that qualify as conventional biofuels. The real question is, irrespective of cellulosic biofuels, is 15 bgy of corn ethanol production still a responsible target? The answer is yes. The RFS strikes the right balance between incenting the use of conventional and advanced biofuels.

7. What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramps up?

The potential upside of a domestic cellulosic biofuels industry is enormous. For rural economies, it means that biofuel producers will begin utilizing plentiful natural resources that currently have zero to low value, including corn stover and other agricultural residues, energy crops and waste. For states

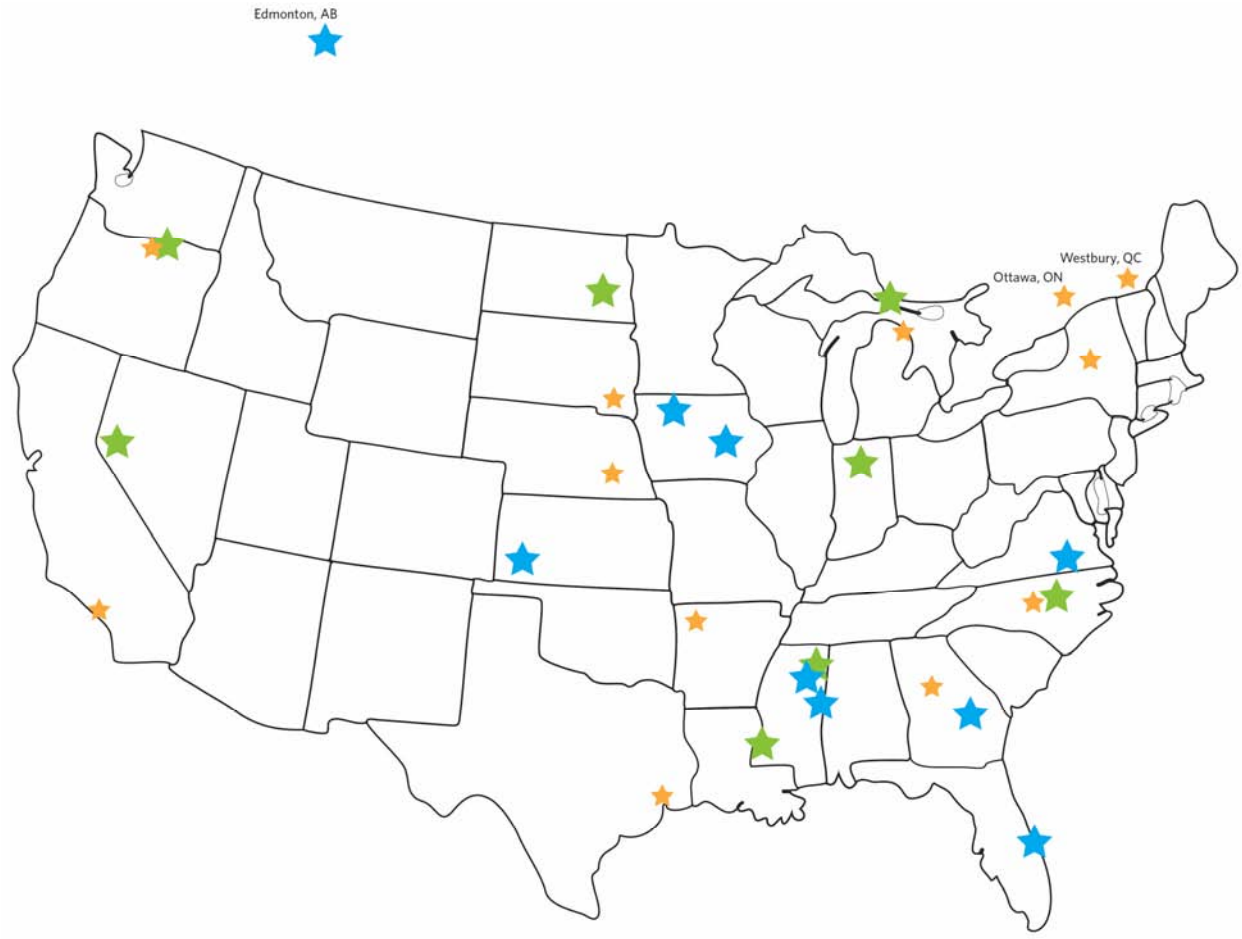
outside of the Corn Belt, cellulosic biofuel production will open up a whole new spectrum of opportunity for areas not often associated with the biofuels industry. According to the Sandia National Laboratory, the U.S. could produce 75 billion gallons per year of cellulosic biofuels without displacing food and feed crops.[7] There are two additional studies worth consideration by the Committee: (1) an RFS study by Bio-Economic Research Associates concluding that compliance with the advanced biofuels requirement of the RFS will create roughly 800,000 direct and indirect jobs; and, (2) a study by DOE/Oak Ridge National Laboratory, which projects the RFS to create an increase of 0.8% in U.S. gross domestic product (GDP) in 2022…[well in excess of $100 billion]" stemming from the fact that the RFS is reducing crude oil prices, decreasing crude oil imports, increasing gross domestic product (GDP), and having only minimal impacts on global food markets and land use.[8] Roughly half of these impacts are from advanced biofuels.

8. Will the cellulosic biofuels provisions succeed in diversifying the RFS?

Much has been made of the alleged delays in the commercial deployment of cellulosic biofuels. However, as shown in the AEC Progress Report released in December 2012 (see U.S. Map below), the industry is breaking through at commercial scale just five years after the enactment of the amended RFS and notwithstanding the global recession.[9] As noted in recent documentation released by U.S. EPA, the production cost of cellulosic biofuels continues to fall; the industry continues to make significant progress towards producing cellulosic biofuel at prices competitive with petroleum fuels; cellulosic biofuel producers faced not only the challenge of the scale-up of innovative, first-of-kind technology, "but also the challenge of securing funding in a difficult economy;" that it is reasonable to expect production and capital costs to continue to decline as more facilities come online and the so-called "commercial learning curve" is achieved; and, first commercial projects in the pipeline for cellulosic biofuels have made great progress in securing the necessary feedstock for their plants.[10] These industrial benchmarks are also widely reported in a number of academic studies.[11] For example, an industry survey conducted by Bloomberg New Energy Finance concluded that "[t]he operating costs of the [cellulosic biofuel] process have dropped significantly since 2008 due to leaps forward in the technology … [f]or example, the enzyme cost for a litre of cellulosic ethanol has come down 72% between 2008 and 2012."[12] As cellulosic biofuel production technology continues to mature, the U.S. advanced biofuels industry is ramping up to compete in the $2.5 trillion global clean energy marketplace and deliver the advanced renewable fuels required by the federal Renewable Fuel Standard (RFS).

[7] See https://share.sandia.gov/news/resources/news_releases/biofuels-can-provide-viable-sustainable-solution-to-reducing-petroleum-dependence-say-sandia-researchers/.
[8] See U.S. Economic Impact of Advanced Biofuels Production: Perspectives to 2030, Bio-Economic Research Associates; and, http://www.future-science.com/doi/abs/10.4155/bfs.12.60?journalCode=bfs.
[9] See AEC Progress Report: Cellulosic Biofuels at http://ethanolrfa.3cdn.net/96a2f9e04eb357bbbd_1sm6vadqk.pdf.
[10] See Docket ID No. EPA-HQ-OAR-2012-0546: Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards
[11] See: *Cellulosic Ethanol Heads for Cost-Competiveness by 2016, http://about.bnef.com/press-releases/cellulosic-ethanol-heads-for-cost-competitiveness-by-2016/;* Brown, T., Brown, R. "A review of cellulosic biofuel commercial-scale projects in the United States." Biofuels, Bioprod. Bioref. DOI:10.1002/bbb.1387 (2013).
[12] See http://about.bnef.com/press-releases/cellulosic-ethanol-heads-for-cost-competitiveness-by-2016/

Locations of Projects Profiled by AEC Progress Report[13]



Non-U.S./Canada Technological Development, by Location

Cellulosic Biofuel Production Facilities Outside of the U.S./Canada Developing Technologies for Deployment in the U.S.

KEY	
	PILOT/DEMONSTRATION FACILITY
	COMMERCIAL FACILITY (UNDER CONSTRUCTION/COMMISSIONING)
	COMMERCIAL FACILITY (ENGINEERING STAGE)

[13] To view full AEC Progress report, see http://ethanolrfa.3cdn.net/96a2f9e04eb357bbbd_1sm6vadqk.pdf.

9. What is the scale of the impact of the RFS on international agricultural production and global land use changes?

As discussed, the predominant fuel required for use by the RFS to date (corn ethanol) utilizes just 3% of the world's grain supply. A study by Sandia National Lab concluded that the U.S. alone could produce 75 billion gallons of cellulosic biofuels without displacing food or feed markets. The RFS fully considered the potential impact of land use change when it required land use change to be part of the eligibility criteria for the RFS. When considering this issue, we encourage the Committee to closely consider the recent study published by Oak Ridge/DOE, which concluded that RFS2 will result in "…a slight [net] reduction in global land use for agriculture." [14] The report concluded that any marginal increase in agricultural land use resulting from RFS2 would be largely constrained to the United States and would be offset by decreases in land use in other regions. It also concluded that U.S. agricultural land use would be just 0.4% higher in 2015 than would be the case without the RFS2 in place. While the AEC is skeptical of the various other economic model runs alleging (to date, unvalidated) significant land use change impacts, we are confident that RFS2 has addressed the issue by including it in its eligibility criteria.

As discussed in our prior written responses to the white paper review, the RFS is the global gold standard when it comes to advanced biofuel policy. It is the U.S. advantage when it comes to attracting a quickly innovating industry to the Unites States. Legislative intervention at this point in its deployment is unwarranted and would be the equivalent of exporting the advanced biofuels industry opportunity to other countries that are maintaining their long-term commitment to renewable energy.

Thank you for the opportunity to comment on the RFS.

Sincerely,

R. Brooke Coleman
Executive Director
Advanced Ethanol Council (AEC)

[14] See http://www.future-science.com/doi/abs/10.4155/bfs.12.60?journalCode=bfs.

AFPM
American
Fuel & Petrochemical
Manufacturers

Comments of the American Fuel & Petrochemical Manufacturers on the House Energy and Commerce Committee's "Renewable Fuel Standard Whitepaper- Agricultural Impacts"

The American Fuel & Petrochemical Manufacturers (AFPM)[1] submits comments in response to the House Energy & Commerce Committee's whitepaper on the Renewable Fuel Standard (RFS) and its agricultural sector impacts. As refiners and importers of liquid transportation fuels, AFPM members are "obligated parties" under the RFS. Our nation's domestic petroleum refiners are committed to manufacturing safe, reliable and clean transportation fuels, and we will continue to oppose any actions that could endanger the safety of the American families, farmers and truckers we serve every day. We take the confidence Americans place in our products – demonstrated by the millions of times each day that consumers purchase gasoline and diesel fuel – very seriously.

AFPM opposes the mandated use of alternative fuels and supports the sensible and workable integration of these fuels into the marketplace that allows consumers to choose the energy source that best fulfill their needs. Energy policy based on mandates ultimately disadvantages consumers. There is no free market if every gallon of biofuel – including those that do not exist – is mandated. Mandates distort markets and result in stifled competition and innovation.

Policymakers should carefully consider the intended and unintended impacts of policies on the environment, energy security and consumers. Unfortunately, market interfering regulations or legislation, especially involving energy and environmental policies, can and do have significant unintended negative consequences. An example of such consequences can be seen with biofuels mandates that are being rethought across the globe amid serious economic and environmental concerns. The RFS is unworkable and AFPM urges its full repeal.

1. **What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?**

   The U.S. used approximately 40 percent of its domestic corn crop to produce ethanol last year, making the ethanol industry the largest single user of U.S. corn. Ethanol accounts for about 7 percent of gasoline consumption on an energy-equivalent basis.[2,3] Corn prices (average farm) are forecast to average $6.90 per bushel during 2012/13, more than double the average during 2006/07 of $3.04, the year before Congress passed the Energy Independence and Security Act of 2007.[4] The Congressional Research Service (CRS) reported in March that corn prices "have trended steadily

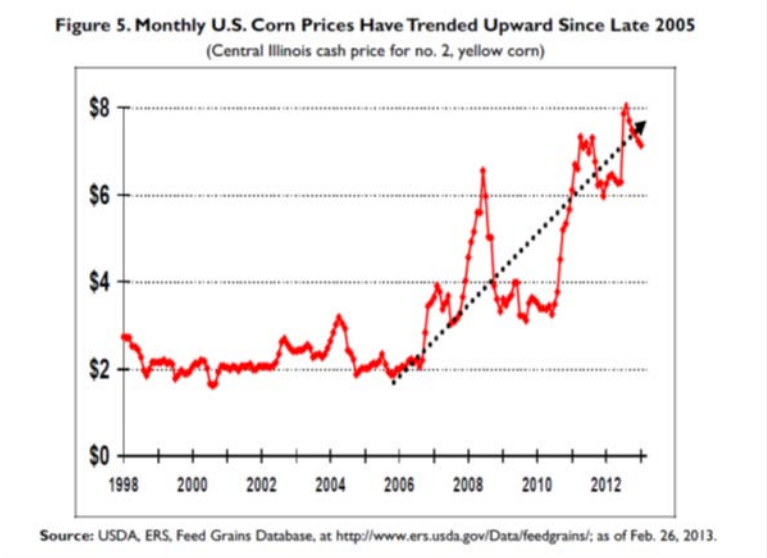
[1] AFPM is a trade association representing high-tech American manufacturers of virtually the entire U.S. supply of gasoline, diesel, jet fuel, other fuels and home heating oil, as well as the petrochemicals used as building blocks for thousands of products vital to everyday life.

[2] Randy Schnepf and Brent D. Yacobucci, *Renewable Fuel Standard (RFS): Overview and Issues*, Congressional Research Service, R40155 at 26 (March 14, 2013).

[3] Some of the corn use returned to the feed supply in the form of dried-distillers grains (DDGs), which are not a perfect substitute for corn in animal, and tend to closely track corn prices.

[4] USDA Economic Research Service

upward in direct relation to the added growth in demand from the ethanol sector."[5] (See graph below.)



According to Stanford University's Center for Food Security & the Environment, "Policies such as the United States' Renewable Fuel Standard (RFS), have reshaped price and supply dynamics in food markets… Because of the substitutability of basic food commodities, prices of corn ripple through all of the world food economy markets and affect demand and supply of wheat, rice and soy. Poor households in the developing world, where 70-80% of the budget is spent on food, will be hurt the most."[6] Modeling studies by the Word Bank concluded that "Expanding biofuel production in the next decade could increase global prices for corn and other major grains by as much as 3% and the price of sugar by 8%. Poor people in some developing countries would find it harder to afford an adequate diet."[7]The Food and Agriculture Organization of the United Nations studies also raises concerns: "Expected 70% increase in global food demand to 2050, doubled in developing countries… Growing biofuels market is a new source of demand, impacting food markets through related land use changes."[8] AFPM will defer to these and dozens of economists, think tanks, and colleagues in other industries that have concluded ethanol production is the largest driver of corn prices since 2007.

It makes little economic sense to tie energy and food prices together, and link them to weather in the Midwest. AFPM supports market based policies to increase domestic oil and gas production (which benefit from neither subsidies nor mandates). In fact, technological advances in oil and gas production mean that the U.S. now projects a 23 percent increase in oil production and 62 percent increase in natural gas production for 2022 compared with 2007 estimates of 2022 production.[9] These advances mean that North America can be completely energy secure by 2025 without the

[5] Randy Schnepf and Brent D. Yacobucci at 21.
[6] http://foodsecurity.stanford.edu/news/biofuels_have_mixed_impacts_on_food_security_20120419
[7]http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/0,,contentMDK:22946809~pagePK:64165401~piPK:64165026~theSitePK:469372,00.htm
[8] http://www.agri-outlook.org/dataoecd/13/13/45438527.pdf
[9] Derived from Energy Information Administration, *Annual Energy Outlook 2007, 2012 and 2013 Early Release*

RFS, reducing U.S. exposure to volatile swings brought on by global instability. In the meantime, Congress should repeal the RFS to alleviate the pressure the law is placing on food and feed prices.

2. How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?

The data indicates that the impact of the RFS on rural America is mixed, at best. Certainly, those in corn production have benefited from higher prices driven by a mandate for their product. However, many in animal agriculture and in food processing have suffered as a result. Since 2008, eight major poultry companies have declared bankruptcy.[10] The total food system lost $71 billion between 2005 and 2012 as the result of the RFS.[11] Moreover, the story of job growth in the ethanol industry must not be viewed in a vacuum. Rather it should be viewed in the context of the best economic use for a bushel of corn. In particular, a bushel of corn used for meat and poultry production creates 29 times more direct jobs than it does for the same amount of corn used in ethanol production.[12]

AFPM is neither anti-biofuels nor anti-ethanol; it is anti-mandate. Ethanol is a quality additive in the right amounts, and it is likely that a robust market for ethanol will continue to thrive in the absence of mandates. Unfortunately, the RFS mandates consumption amounts that – if fully implemented— will cause severe economic harm for all Americans, including farmers. Decisions about the highest and best use of our food and feed should be guided by the free market, not by Washington.

3. Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

EPA's decision to reject the 2012 waiver request stemming from the worst U.S. drought in 60 years— a waiver requested by 8 governors and supported by 156 Congressman and 32 Senators— demonstrated the inflexibility of the waiver and the mandates.[13] In order to grant waivers, EPA has self-imposed and insurmountable hurdles. Notwithstanding, AFPM submitted detailed comments to EPA that underscored that the waiver provision itself, which is on an annual basis, is not an effective mechanism to mitigate the issues with the RFS. The RFS mandate needs to be repealed.

Obligated parties need certainty to plan and optimize operations and logistics in order to deliver transportation fuels efficiently. In particular, refiners are unable to immediately switch between types of base gasoline (currently manufactured to accept 10 percent ethanol). Changing manufacturing specifications and reworking logistics (particularly through common-carrier pipelines and terminals) would likely take longer than a year to occur. In the meantime, the RFS blendwall is here. While Congress reevaluates the RFS, EPA has the tools to address the short term issues and mitigate problems stemming from the blendwall. In its comments to EPA on the 2013 proposed Renewable Volume Obligation (RVO), AFPM recommended that EPA exercise its discretionary authority to waive "in whole or in part" the 2013 requirements. At a minimum, EPA should adjust

---

[10] Dr. Thomas E. Elam, *The Renewable Fuels Standard: Real Costs, and Need for Reform*, p. 4 (Feb. 14, 2012), available at http://www.farmecon.com/Documents/RFS%20Reform%20FARMECON%20LLC%202-5-13.pdf

[11] *Id.*

[12] Dr. Thomas E. Elam, *Ethanol Production: Economic Impact on Meat and Poultry Consumption, Value, and Jobs*, p. 7 (October 30, 2012).

[13] The Governors of Georgia, Delaware, Arkansas, Maryland, New Mexico, North Carolina, Texas, and Virginia all petitioned EPA for a waiver under §211(o)(7)(A) of the Clean Air Act.

the RVOs advanced and total RFS volumetric standards to ensure that the ethanol E10 blendwall is not breached.

4. Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

As discussed in our response to question three, the current waiver process is insufficient to address food and feed issues. EPA's interpretation of the *severe harm* requirement is overly stringent, as evidenced by its refusal to grant a waiver during the worst drought in decades. In addition, the year-long limitation on waivers is insufficient to significantly change market dynamics, as refiners are unable to alter blending on short notice.

6. What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?/7. What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramps up?

The 2011 National Academy of Sciences report concludes that "absent major increases in agricultural yields and improvement in the efficiency of converting biomass to fuels, additional cropland will be required for cellulosic feedstock production; thus implementation of the RFS2 is expected to create competition among different land uses, raise cropland prices, and increase the cost of food and feed production… If the U.S. produces 16 billion gallons of ethanol equivalent cellulosic biofuels by 2022, 30-60 million acres of land might be required for cellulosic biomass feedstock production, thereby creating competition among land uses. "[14]

EPA currently waives the cellulosic biofuels mandates each year because near zero gallons are commercially available. If, however, cellulosic ethanol were produced in volumes envisioned by the statute (1 billion gallons in 2013), then the blendwall AFPM discussed in response to the Committee's first whitepaper would be an even larger problem. Ethanol is ethanol, regardless of feedstock, and so cellulosic ethanol encounters the same technical and market barriers as corn ethanol—including the blendwall. The projected implications of the blendwall are staggering. The U.S. gasoline market is already hitting the blendwall, but unless Congress takes action, over the next few years the consequences will grow. According to independent analysis of its economic consequences, the blendwall will significantly increase the cost of producing both gasoline and diesel.[15]

Ironically, higher fuel costs induced by the blendwall will likely adversely impact U.S. farmers and ranchers. In particular, diesel is a major cost driver of agricultural production. For example, in 2011, U.S. farms consumed approximately 2.9 billion gallons of diesel.[16] Increasing the cost of producing gasoline and diesel will directly impact the cost of doing business for farmers and ranchers. In 2010, EIA estimated that every dime added to the price of gasoline and diesel oil, sustained over a year,

---

[14] Potential Economic and Environmental Effects of U.S. Biofuel Policy", National Academy of Sciences, October 2011, http://www.nap.edu/catalog.php?record_id=13105

[15] *See* NERA Economic Consulting, *Economic Impacts Resulting from Implementation of RFS2 Program* (October 2012).

[16] Energy Information Administration, *Sales of Distillate Fuel Oil by End Use*, available at http://www.eia.gov/dnav/pet/pet_cons_821dst_dcu_nus_a.htm.

costs U.S. agriculture $381 million.[17] Other (non-ethanol) cellulosic and advanced fuels are likely to be produced in such small amounts that they will have little impact on the market, as discussed below.

Although (theoretically) cellulosic biofuels can be produced from various feedstocks sourced from geographically diverse areas of the country, the data shows that the government cannot mandate innovation and favorable economics and so these fuels are unlikely to materialize in the volumes envisioned by the RFS.

Despite a generous subsidy of $1.01 per gallon, cellulosic biofuels are simply not a commercial reality. Yes, some plant construction has, and is occurring in the cellulosic biofuels industry—yet we also know that construction doesn't mean success and that mandates and subsidies do not necessarily help. In fact, the largest producer of cellulosic biofuels to date, Western Biomass Energy LLC, recently declared bankruptcy.[18] Range Fuels went bankrupt in 2011 after receiving $90 million in federal and state assistance. In 2011, the National Academy of Sciences concluded that, "…with the data that are available and the present state of technology, cellulosic biofuel is non cost-competitive with fossil fuels without government support."[19]

8. Will the cellulosic biofuels provisions succeed in diversifying the RFS?

Cellulosic biofuels will have minimal, if any, success in diversifying the RFS. In 2012, total cellulosic biofuel production was 21,093 gallons, out of which 20,069 gallons were exported to Brazil for a climate conference in April 2012 (Rio+20) and unavailable for RFS compliance, after which time the producer filed for bankruptcy.[20] These are very small volumes corresponding to a cellulosic RFS RVO percentage standard of less than 0.00002% .[21]

The Energy Information Administration is also skeptical about the United States' ability to meet RFS targets. The following graph shows EIA projections of less than 0.5 out of 36 billion gallons of mandated cellulosic biofuels projected to be available in 2022. It is noteworthy that EIA lowered its estimates in 2013 vs. 2012.

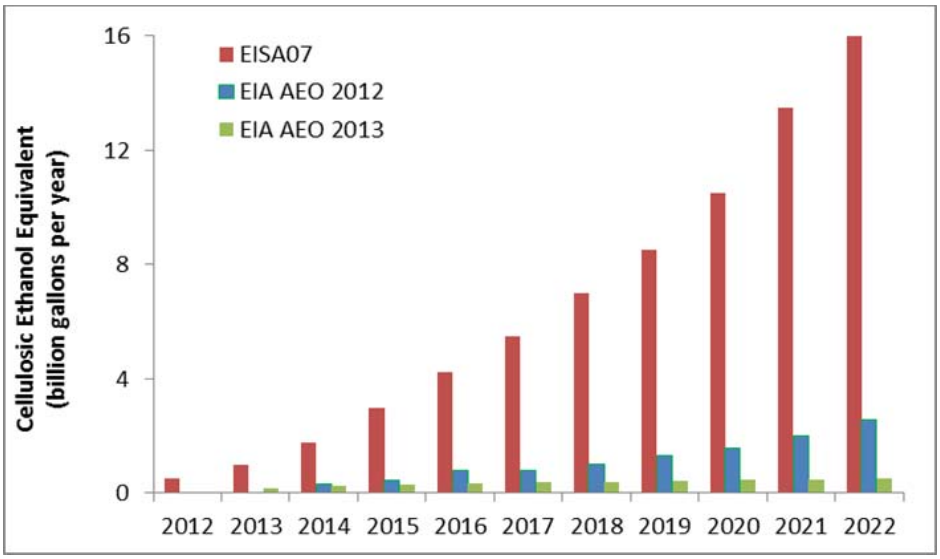
[17] Testimony of Richard Newell, Administrator, U.S. Energy Information Administration Before the Committee on Agriculture, Nutrition, and Forestry, U. S. Senate, March 30, 2011. http://www.eia.doe.gov/neic/speeches/newell_03302011.pdf

[18] http://www.ethanolproducer.com/articles/9549/western-biomass-energy-in-chapter-11-reorganization

[19] National Research Council. *Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy*. The National Academies Press, p. 174 (2011).

[20] http://www.ethanolproducer.com/articles/9549/western-biomass-energy-in-chapter-11-reorganization

[21] EPA Moderated Transaction System, available at http://www.epa.gov/otaq/fuels/rfsdata/2012emts.htm (accessed April 23, 2013).



Furthermore, drop-in biofuels are not in the market today and are not projected to become a large part of the energy mix. In fact, drop-in fuels are not projected to be commercially available in large quantities during the life of the RFS. EIA projects that only 95 million gallons of drop-in gasoline (381 million gallons of drop-ins overall) will be available in 2022- enough to satisfy .07 percent of projected gasoline demand.[22]

Conclusion

For the foregoing reasons, the Renewable Fuel Standard is not a panacea for rural development in the United States, and ironically, may induce more economic harm than growth if Congress does not act. In fact, the mandate could be creating an artificial bubble that bursts when the adverse impacts of the RFS lead to consumer backlash against ethanol generally, not just the mandate for the product. AFPM is not anti-biofuels and supports our friends in the agricultural sector. For AFPM and its members, the debate over the RFS is not about the virtues of biofuels, it is about the need for responsible integration of biofuels into the fuel supply, driven by innovation and market realties rather than government mandates. Then, and only then, will consumers have access to the highest quality fuels at the lowest price. AFPM appreciates the opportunity to share its views.

[22] Mac Statton, *Drop In Biofuels in the AEO*, Energy Information Administration Biofuels Workshop, March 20, 2013

Mary Rosenthal
Executive Director
P.O. Box 369
Preston, MN 55965
(763)458-0068
mrosenthal@algaebiomass.org

Algae Biomass Organization

Comments to the Renewable Fuel Standard Assessment White Paper:

Agricultural Sector Impacts

The Algae Biomass Organization (ABO) appreciates the opportunity to provide comments to the Energy and Commerce Committee on the Renewable Fuel Standard (RFS) and its impact on agriculture. The ABO represents the entire algae value chain, from algae growers to researchers to algae oil producers.

The ABO strongly supports the RFS. The RFS plays a critical role in driving the innovation needed for a strong American biofuel industry. The RFS provides the market "pull" for biofuels, incentivizing private industry to conduct the research, development, and deployment needed to commercialize their products at a competitive cost.

The ABO supports the inclusion of cellulosic biofuels in the RFS. As the Energy and Commerce Committee's white paper points out, Congress amended the RFS in 2007 in order to diversify the renewable fuel supply and reduce the impact of the RFS on the agriculture industry. ABO members agree that cellulosic and other advanced biofuels can alleviate the negative impact the RFS may have on agriculture. As a result, we strongly support a diverse portfolio of allowable fuels, including those derived from algae. Further, Congress can strengthen this policy by amending the RFS to accord algae-based biofuels the same treatment as cellulosic biofuels.[1]

For numerous reasons, algae are one of the most promising long-term, sustainable sources of biomass and oils for fuel, food, feed, and other co-products. First, algae does not compete with agriculture. Algae can be grown on land that is unsuitable for traditional agriculture. It can also be grown in seawater, brackish water, and wastewater that is usable for crops.

[1] Section 211(o) of the Clean Air Act defines "advanced biofuel" as renewable fuel other than corn ethanol that has lifecycle greenhouse gas emissions at least 50% below the baseline. The definition of "renewable fuel," in turn, is "fuel produced from renewable biomass that is used to replace or reduce the quantity of fossil fuel present in a transportation fuel," and algae is specifically included in the definition of renewable biomass (section 211(o)(1)(I)(vi)). Given these definitions, algae-based fuel is fuel produced from renewable biomass and hence is renewable fuel that qualifies as advanced biofuel so long as it meets the 50% reduction standard.

Second, algae grow very quickly, in some cases doubling every few hours. As opposed to the long growing schedules for traditional crops, algae can be harvested daily. Thus, algae have the potential to produce significantly larger volumes of biomass and biofuel than some of our most productive crops. Some ABO member companies are on track to produce 5,000 to 7,000 gallons of biofuel from algal oil per acre per year. And ABO member company, Algenol, has developed technology which can yield more than 9,000 gallons of algae ethanol per acre per year.

Third, algae can help alleviate any negative affects of the RFS on agriculture by contributing to increased food and feed production. Microalgae can be cultivated to have high protein and high oil content. For this reason, some ABO members are working on producing animal feed and dietary supplements to advance human health in addition to biomass for fuel.

Another positive impact of the RFS is job creation. As the Committee's white paper notes, proponents of the RFS have argued that the program would strengthen rural economies. The development of the algae industry would help Congress meet this objective. Based on market research, the ABO projects that the algae industry has the potential to create 220,000 jobs by 2020. This job creation would primarily occur in rural areas, where the production and processing of algae can bring high-skilled, high-paying jobs to strengthen local economies.

In conclusion, the ABO supports the RFS and believes that algae-based fuels, along with cellulosic biofuels, can play an important role in mitigating the potential effects of the RFS on food prices and supply.

Sincerely,

Mary Rosenthal
Executive Director
Algae Biomass Organization
mrosenthal@algaebiomass.org
www.algaebiomass.org

American Bakers Association
Serving the Baking Industry Since 1897

April 29, 2013

The Honorable Fred Upton
Chairman
Committee on Energy and Commerce
U.S. House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515

The Honorable Henry Waxman
Ranking Member
Committee on Energy and Commerce
U.S. House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton and Ranking Member Waxman:

The American Bakers Association (ABA) submits the following comments in response to the House Energy and Commerce Committee's "*Renewable Fuel Standard (RFS) Assessment White Paper - Agricultural Sector Impacts*" that was issued on April 18, 2013. The American Bakers Association is the Washington D.C. based voice of the wholesale baking industry. Since 1897, ABA has represented the interests of bakers before the U.S. Congress, federal agencies, and international regulatory authorities. ABA advocates on behalf of more than 700 baking facilities and baking company suppliers. ABA members produce bread, rolls, crackers, bagels, sweet goods, tortillas and many other wholesome, nutritious, baked products for America's families. The baking industry generates more than $102 billion in economic activity annually and employs close to half a million highly skilled people.

We support the House Energy and Commerce Committee's commitment to look more closely at the RFS that was created by the Energy Policy Act of 2005 and further expanded with the passage of the Energy Independence and Security Act of 2007. The ABA supports the development of advanced biofuels and urges the support of policies that will encourage and help efficiently commercialize fuels that do not put America's energy security needs at odds with the nation's affordable food supply.

Recent Trends in the Wheat Market and its Impact on America's Baking Companies

The wheat market typically follows the corn market, so when the RFS artificially drives corn prices higher, wheat prices also rise. Some studies show that the RFS has driven corn prices up by 35 percent during the 2011-2012 crop year.[1] This has a significant impact on wheat prices as well. In addition, the RFS has created an insatiable demand for corn and soybeans, driving farmers to plant more of these crops instead of wheat. While we do not fault the farmer for planting what will bring the most profit, wheat acreage has declined by almost 25 million acres over the past 30 years, in large part due to the RFS. As supply decreased in 2012, the price of wheat increased approximately 50 percent from early summer to more than $9 per bushel in late summer. Therefore, we believe that the RFS has contributed to a significant price increase and continued volatility of a staple ingredient in the baking industry.

Trends in the Wheat Market A "Perfect Storm" of Rising Prices and Declining Acreage

[1] 1 "*Feed Grains, Ethanol and Energy – Emerging Price Relationships,*" Dr. Tom Elam, President, FarmEcon LLC, Dr. Steve Meyer, President, Paragon Economics, 12/27/2010

During the years following the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007, many agricultural commodities started an upward trend. In the 2004/2005 marketing year, the average price received by farmers per bushel of wheat was $3.40. The average for the 2011/2012 was $7.28.[2] The price of corn received in the 2004/2005 marketing year was $2.42 and $6.18 for 2011/2012[3] (see Figure 1, appendix). While there are many factors that influence agricultural markets, it is difficult to ignore the impact of the demand for ethanol on these markets. Figure 2 (see attached Appendix) illustrates the dramatic increase in bushels of corn dedicated to ethanol corresponding with the passage of the 2005 Energy Policy Act, and Figure 3 suggests that the price of corn during the current 2011/12 crop year would have averaged more than $2 per bushel lower if ethanol mandates had not been in effect.

As referenced above, another factor that impacts the price of wheat is the number of wheat acres planted each year in the U.S. The impact of declining wheat acreage due to the fuel-driven demand to grow more corn combined with other factors (weather conditions, government land retirement programs such as the Conservation Reserve Program, index fund investment in the wheat market) has placed tremendous pressure on competition for acreage. In 1980, planted corn acreage was at just over 84 million acres. Corn acreage for the 2011 year was almost 92 million acres.[4] At the same time, acreage for wheat went from over 80 million acres in 1980 to just over 54 million acres in 2011[5] (see Figure 4), a decrease of over 1 billion bushels in U.S. wheat production capacity.

In addition, stagnant yield improvement over the past 30 years for wheat has only exacerbated the problem (see Figure 5). Corn yields have increased almost 65 percent since 1980, while wheat yields have only increased by about 17 percent[6]. Corn is much more profitable per acre than wheat, and much of that profit is driven by demand for corn-based ethanol in the RFS.

These facts also present a causal relationship between corn-based ethanol mandate and rising food prices. Between January 2007 and September 2011, the FAO Food Price Index showed world cereal prices increased by 69 percent, and dairy prices increased 46 percent.[7] U.S. prices for dairy products, eggs, and baked goods were also impacted. Due to the corn-ethanol mandate, for every $1 increase per bushel for corn, eggs increase by 5.5 percent, milk increases by 2.1 percent, and baked goods increase by .3 percent.[8]

Due to the 2005 and 2007 corn-based ethanol mandates, wheat could not (and cannot) compete for finite acreage against other biofuel crops. With the addition of E15, estimates show that corn acreage may need to increase to as much as 110 million acres in order to meet demand[9]. With increasing ethanol mandates due to the RFS2, and with the inability of second generation biofuels to come online quickly to relieve pressure on the demand for corn-based ethanol, corn will continue to win the battle over finite farmland in the and drive food prices both domestically and internationally.

---

[2] USDA Economic Research Service (ERS). *Wheat Data: Average Price Received by Farmers, US.*
[3] USDA ERS. *Season Average Price Forecasts and Historical Data.*
[4] USDA ERS. *Briefing Rooms: Corn – US Acreage and Yield*http://science.house.gov/hearing/subcommittee-space-hearing-overview-national-aeronautics-and-space-administration-budget
[5] USDA ERS. *Wheat: Planted acreage, harvested acreage, production, yield, and farm price.*
[6] USDA ERS. *Wheat Planted acreage & Corn – US Acreage and Yield.*
[7] Griffin, James M. and Mauricio Cifuentes Soto. *U.S. Ethanol Policy: The Unintended Consequences.* Mosbacher Institute, Texas A&M University. 2012
[8] Hayes, D. et al. *Biofuels: Potential Production Capacity, Effects on Grain and Livestock Sectors, and Implications for Food Prices and Consumers.* Journal of Agricultural and Applied Economics 41(2): 465-491. 2009.
[9] Advanced Economic Solutions. *Implications for US Corn Availability under a Higher Blending Rate for Ethanol" How Much Corn Will Be Needed?* by Bill Lapp. June 2009.

The RFS Waiver Process

The ABA urged the Environmental Protection Agency (EPA) to grant a waiver request to reduce the 2008 Renewable Fuel Standard (RFS) by half. The request was submitted to the Agency by Texas Governor Rick Perry at a time when there were concerns about the corn-based ethanol program as it related to the nation's current wheat supply and commodity volatility in 2008. Again in 2012, ABA urged EPA to grant a RFS waiver after more than half of the nation's counties were declared disaster areas due to drought and the U.S. Department of Agriculture (USDA) reported that more than half of the U.S. corn crop would be listed as "poor" to "very poor".

ABA believes that the Clean Air Act does not provide adequate flexibility to address the impact that the RFS may have in combination with other factors leading to limited commodity availability or other economic impacts. ABA recommends that the Clean Air Act be modified to allow the EPA to grant a waiver based on economic effects on the food industry or other impacted sector, not just the overall US economy. For example:

> . . .
> **(7) Waivers**
> **(A) In general**
> The Administrator, in consultation with the Secretary of Agriculture and the Secretary of Energy, may waive the requirements of paragraph (2) in whole or in part on petition by one or more States, by any person subject to the requirements of this subsection, or by the Administrator on his own motion by reducing the national quantity of renewable fuel required under paragraph (2)-
> **(i)** based on a determination by the Administrator, after public notice and opportunity for comment, that implementation of the requirement would, *alone or in combination with other factors, or as a result of factors or events independent of the implementation of the requirement,* severely harm the economy, *or a significant sector of the economy,* or environment of a State, a region, or the United States; or
> **(ii)** based on a determination by the Administrator, after public notice and opportunity for comment, that there is an inadequate domestic supply.

Conclusion

ABA appreciates the opportunity to provide these comments to the House Committee on Energy and Commerce and we look forward to working with the Committee as it further explores the RFS. If there are any additional questions, please contact me at (202)-789-0300 or via email at rzvaners@americanbakers.org.

Sincerely,

Rasma I. Zvaners
Policy Director

Attachment

APPENDIX

FIGURE 1

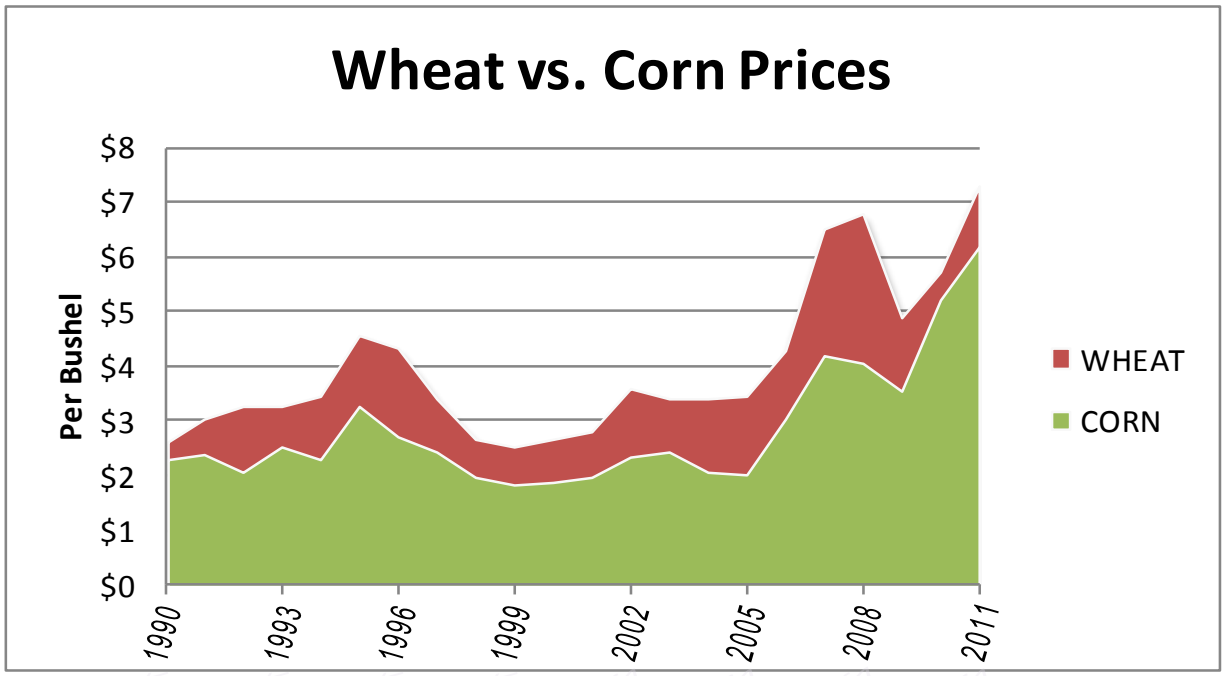


FIGURE 2

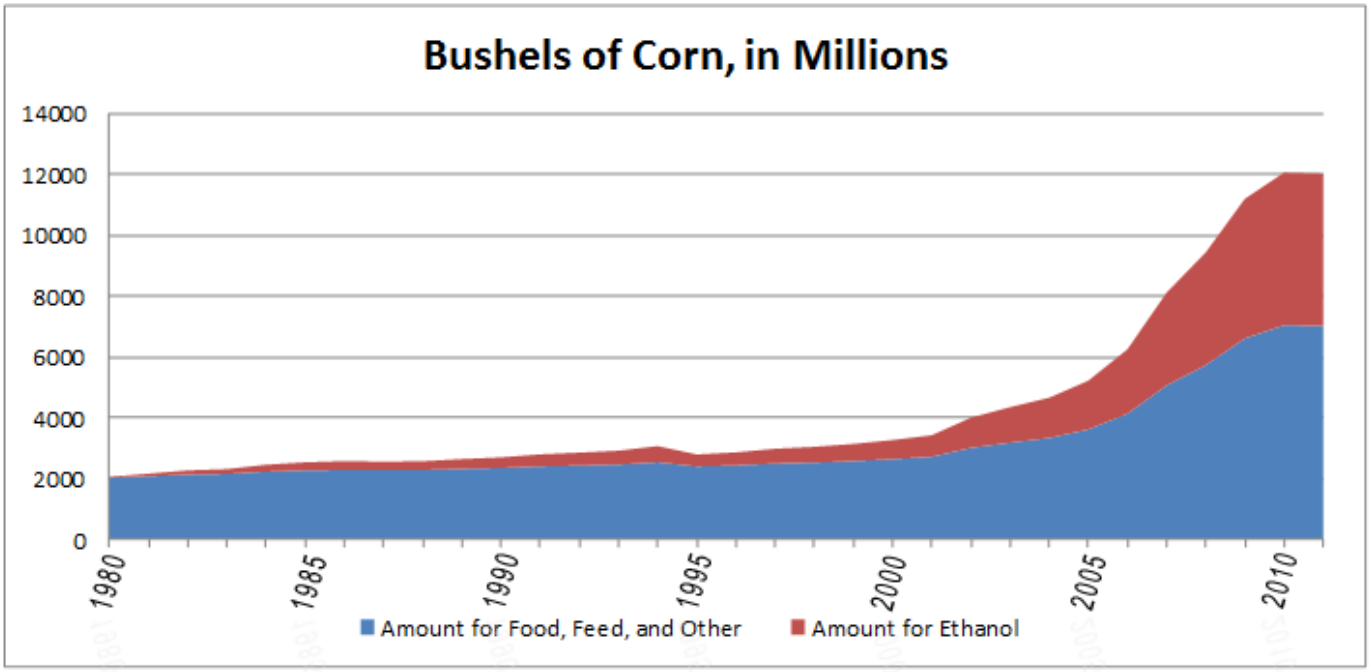


FIGURE 3

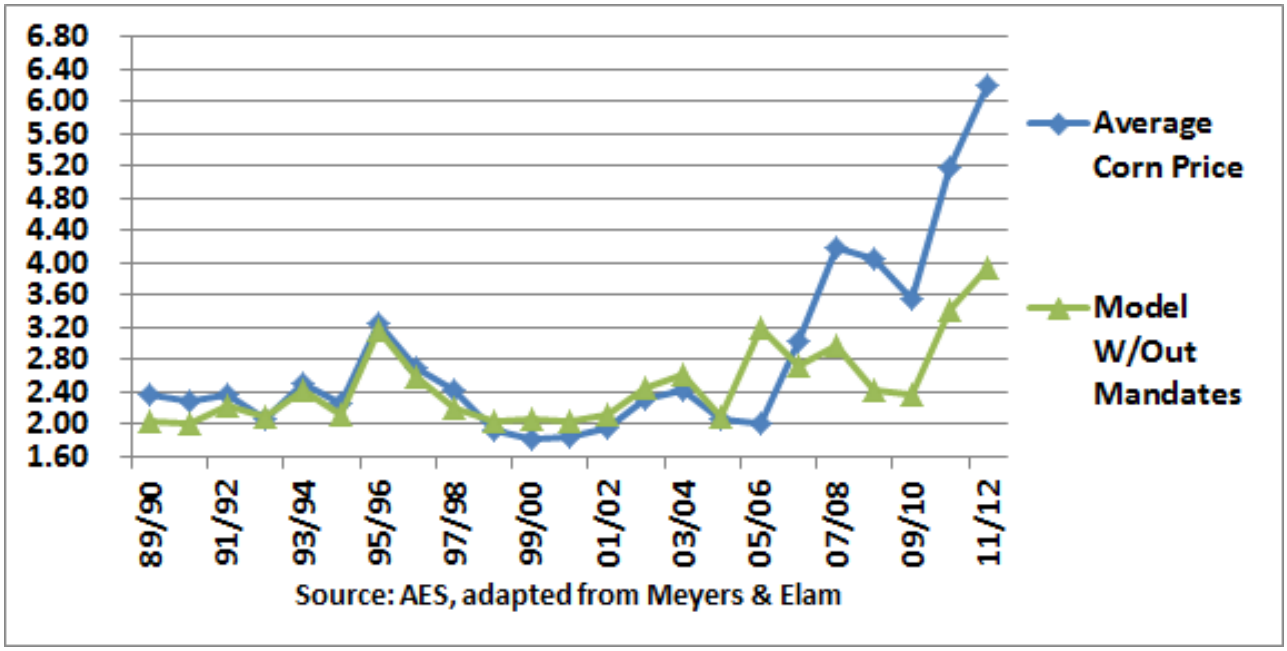
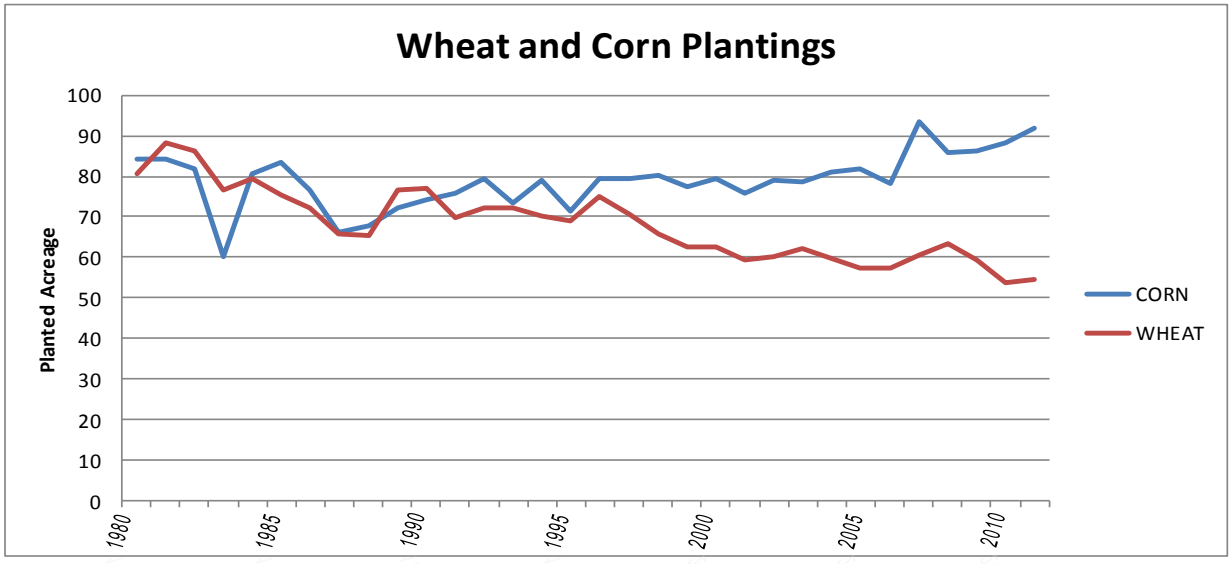


FIGURE 4



April 29, 2013

The Honorable Fred Upton
Chairman
House Energy and Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

The Honorable Henry Waxman
Ranking Member
House Energy and Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton and Ranking Member Waxman:

On behalf of the 600 members of the American Coalition for Ethanol (ACE), I appreciate the opportunity to comment on the Committee's second Renewable Fuel Standard (RFS) White Paper on "Agricultural Sector Impacts."

ACE was founded in 1987 by advocates who believed ethanol would revitalize rural America by enabling farmers to sustainably harness resources to help reduce U.S. dependence on foreign oil. Today ACE includes farmers, ethanol producers, Main Street businesses, science and technology firms, engineers and manufacturers, and industry suppliers who have stood shoulder to shoulder to innovate and grow the domestic ethanol industry in communities throughout the U.S.

We appreciate the opportunity to explain how the RFS is a classic American success story, delivering benefits for U.S. farmers and motorists and everyone in between. Below please find our responses to your questions about the relationship between the RFS and agriculture.

Sincerely,

Brian Jennings, Executive Vice President
American Coalition for Ethanol (ACE)

5000 South Broadband Lane • Suite 224 • Sioux Falls, SD 57108
P: 605.334.3381 • F: 605.334.3389 • www.ethanol.org

1. What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?
It is important for the Committee to recognize that a variety of factors contribute to agricultural commodity prices, primarily U.S. and global weather-related issues (floods, droughts, freezes, normal precipitation, etc impacting supply and demand), global export demand, livestock feed demand, and the factor which is often a root cause of crop price spikes: speculative futures trading by parties who never plant or harvest crops and never intend to buy a physical bushel of corn or other commodities.

It's equally important for the Committee to understand that the Grocery Manufacturers Association, Tyson Foods Inc., The Chicken Council, and others who profited handsomely in the past from corn prices that averaged around $2 per bushel and who are heavily lobbying the Committee to repeal the RFS, profited on the backs of American taxpayers who were paying for multi-billion dollar commodity support programs under previous farm bills. With global oil demand on the rise and global oil prices at a new equilibrium, it is highly unlikely those special interests who feel entitled to cheap corn forever will get their wish.

Because the RFS calls for increased production and use of renewable fuels from feedstocks such as corn, soybeans, and other agricultural commodities, the RFS can and does contribute to higher prices for these crops. Since most, but not all, ACE member-plants produce renewable fuel from corn, our comments will focus on the RFS and corn.

The U.S. Environmental Protection Agency (EPA), in conjunction with the U.S. Departments of Agriculture (USDA) and Energy, was required to do an analysis on the impact of the RFS on corn prices when petitioned by a handful of governors and livestock/meat organizations last year. In a November 2012 decision[1], EPA stated that they "…examined a wide variety of evidence, including modeling the impact that a (RFS) waiver would have on ethanol use, corn prices, and food prices. EPA also looked at empirical evidence, such as the current price for renewable fuel credits, called RINs, which are used to demonstrate compliance with the RFS. We analyzed 500 scenarios, and in 89% of them we see no impacts from the RFS program at all. Looking across 500 scenarios, including those 11% of scenarios where RFS requirements would have an impact on the corn and other markets, the average impact on corn prices is only 7 cents a bushel, less than a one percent change in corn prices." This analysis and other evidence helped EPA determine a waiver of the RFS for the 2012-2013 crop marketing year was not justified.

Perhaps the most recent analysis of the impact of the RFS on corn prices was published on January 4, 2013 by GROWMARK Research, "4 Reasons Why Ethanol Doesn't Drive Corn Prices, A Tale of Two Forces."[2] In their executive summary, these researchers indicate "While it is reasonable to believe that the dramatic increase in corn used for ethanol production would have an effect on corn prices, the 'ethanol effect' is not the only one pushing and pulling on corn prices. A still larger effect is that of investment flows channeled into the corn market by investors/speculators." Their paper demonstrates exactly what the effect of the RFS/ethanol demand and speculation have had on corn prices and shows the ethanol demand is the smaller of the two. The researchers present data proving that increased

[1] EPA Decision to Deny Requests for Waiver of the RFS. November 2012. Retrieved from http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f12075.pdf.
[2] 2013 GROWMARK Inc. Hornblower, Scott. Kelly, Kel. Retrieved from: http://www.growmark.com/sites/Files/Documents/4ReasonsWhyEthanolDoesntDriveCornPrices.pdf

ethanol use has not always correlated with increased corn prices. For example, between 2008 and 2009, ethanol demand for corn increased 24%, while corn prices fell 20% (from the intra-year high to intra-year low, corn prices fell 60%). "Had ethanol been a dominant corn price driver, the continued strong ethanol demand would have prevented a sell-off in the corn markets, and would have instead driven corn prices higher due to the increased corn demand," according to GROWMARK. Their report explains how the production of distillers grain feed by ethanol facilities "means that many traditional buyers of corn are no longer competing with ethanol buyers in the primary market (i.e. buying corn first-hand from grain elevators). Instead, they can wait and obtain the corn fermentation residual (distillers grains) from ethanol producers at lower prices in the secondary market. With ethanol producers giving back a third of their corn purchases (via distillers grain production), their impact on the market, whatever it is, is weaker than is apparent on the surface."

Finally the researchers pinpoint evidence from 2005 to 2012 that speculative investments are the primary driver of corn prices. "Everything from sugar, orange juice, pork bellies, milk, and grains to silver, platinum, zinc, steel, coal, propane, and crude oil have experienced both large price rises and price collapses, nearly simultaneously. While the demand for ethanol could affect the prices of corn and some other commodities, it cannot affect all commodities. This co-movement between corn prices and all other commodities suggests that a common factor, unrelated to ethanol, is shared among these disparate commodities, and, is likely the significant driver of their price movements. This other strong force is the actions of Wall Street investors, or so-called 'speculators.' It is these financial markets investors looking to profit in the corn futures market, not commercial consumers like ethanol plants, hog and cattle producers, and food processors, who are responsible for recent price volatility. While a small portion of Wall Street investors has always been involved in the commodity markets, most current investors came to the commodity markets between 2002 and 2006. Those investors were 1) fleeing the collapsing stock markets in the early 2000s and 2) looking for diversification….Since 2006, over 70% of the transactions in the corn futures market have consisted of speculator funds, and 40% of those transactions come from index investors specifically. Index investors are pension fund, hedge fund, and mutual fund managers looking to profit from the volatility in the corn market by buying corn futures and 'rolling' them from month to month like traditional investments. While these investors tend to buy corn futures as longer term investments (pushing prices higher), they quickly sell out their positions when the market turns for the worse (causing prices to fall precipitously)."

2. How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?

The net impact of the RFS on agriculture, regardless of measurement, has been positive. Beyond the jobs and economic activity that has been generated in rural communities, the most interesting result of the RFS is how it's been a catalyst for more efficient and sustainable agricultural productivity.

Certainly the RFS has helped lead to more corn acres, but it also provides an economic incentive for scientists and technology firms to help farmers sustainably produce significantly more bushels of corn on an acre of existing cropland. Since the RFS was enacted in 2005, these advancements, such as new seed varieties, pest management, and more sustainable tillage practices, have enabled farmers to produce, on average, nearly 20 additional bushels of corn per acre than before. Still more innovations, like drought-tolerant genes, are being developed to improve corn yield further.

Consider 2012, for example. According to USDA, 95.9 million acres of corn were planted last spring for the 2012-2013 marketing year, the most corn planted by U.S. farmers since 1937. Based on this planted

acreage, had the U.S. experienced normal weather conditions, nearly 15 billion bushels of corn, an all-time record, would have been produced, resulting in more than enough corn for all end-use sectors. Arguments over corn rationing would have been replaced by discussions of what to do with a huge surplus.

Indeed, under a scenario in which drought persisted last year exclusive of an RFS, there would be fewer corn bushels available for all end-use sectors and painful rationing would need to occur. According to the National Corn Growers Association, without the RFS, farmers would have planted only about 84 million acres of corn in 2012, not 95.9 million acres, resulting in a "pre-drought deficit" of nearly 4 billion bushels of corn assuming no corn was used for ethanol production. Consider the corn shortfall the U.S. would be facing absent the RFS, whereby a drought shrinks crop yields from a starting point of just 80-some million acres of corn.

To underscore how the RFS has helped make more corn available for all end-users, consider that U.S. corn production during the most recent drought, in 1988, was less than 5 billion bushels. USDA reported that the 2012 corn harvest totaled 10.7 billion bushels, despite the worst drought in 50 years and a reduction in harvested acres. The 2012 drought-ravaged corn crop was twice as large as the drought-ravaged crop of 1988 and three-times larger than the U.S. corn crop 50 years ago. None of this progress would have been possible without the RFS.

With respect to jobs, according to a report by CARDNO ENTRIX, in 2012, 87,000 direct jobs and 295,000 indirect or induced jobs were created as a result of the ethanol industry, for a total of 382,000 jobs.

According to a 2011 Minnesota Department of Agriculture study, 21 ethanol plants, 10 of them farmer-owned, support more than 12,600 jobs, generate $5 billion in economic activity, and more than 11,000 farmers supply feedstocks for ethanol production in the state. This study indicates Minnesota's ethanol industry added $912 million to the value of corn in 2011.

A recent Ohio State University Extension Community Development report indicates Ohio's six ethanol plants support 273 full-time jobs and the direct, indirect, and induced contribution of ethanol in Ohio supports $1.1 billion in economic activity and nearly 13,000 jobs.

3. Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

Yes, EPA was correct to deny the 2012 RFS waiver requests. As hard as it is for some special interests to accept, the primary lesson from the waiver denial is the fact that the drought was the cause of harm to U.S. agriculture (and ethanol producers) in 2012, not the RFS. Those who want to play politics with droughts or demagogue about the RFS without providing facts to substantiate their claims hopefully learned both in 2008 and in 2012 that the law is clear with respect to waiving the RFS.

4. Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

Congress provided EPA with sufficient flexibility within the Clean Air Act to make adjustments to the RFS if necessary. Section 211(o)(7) of the Clean Air Act sets out EPA's authority to waive the RFS (in whole or in part) if the Administrator, in consultation with the Secretary of Agriculture and the Secretary of Energy, determines that implementation of the RFS would severely harm the economy or environment

of a State, a region, or the United States. This language gives EPA significant authority to modify the RFS in years when it is proven that the RFS is the cause of severe harm and that reducing the RFS will alleviate that severe harm. In neither year a waiver petition has been submitted have those requesting the petition proven either point. Despite this lack of substance by the petitioners, EPA worked with USDA and EPA to actually understand what was occurring and why. And, its analysis showed that the RFS was neither the cause nor the solution to the "problem" being claimed by the petitioners.

Having said that, the premise of this question misinterprets the conditions under which adjustments or a waiver would apply. An isolated event, such as a spike in corn prices, does not meet the test Congress envisioned and EPA has applied with respect to RFS waivers or adjustments. Rather, Congress appropriately wanted EPA to consider both the costs and benefits of the RFS in determining whether or not to grant a waiver. In denying the 2008 RFS waiver request by Governor Perry of Texas, EPA explained that "it would be unreasonable to base a waiver determination solely on consideration of impacts of the RFS program to one sector of an economy, without also considering the impacts of the RFS program on other sectors of the economy or on other kinds of impact." The Committee seems to neglect that Congress wanted EPA to conduct a much broader review than simply looking at corn prices, to determine if the RFS is causing harm, generally taking in to account positives and potential negatives of the program on the economy.

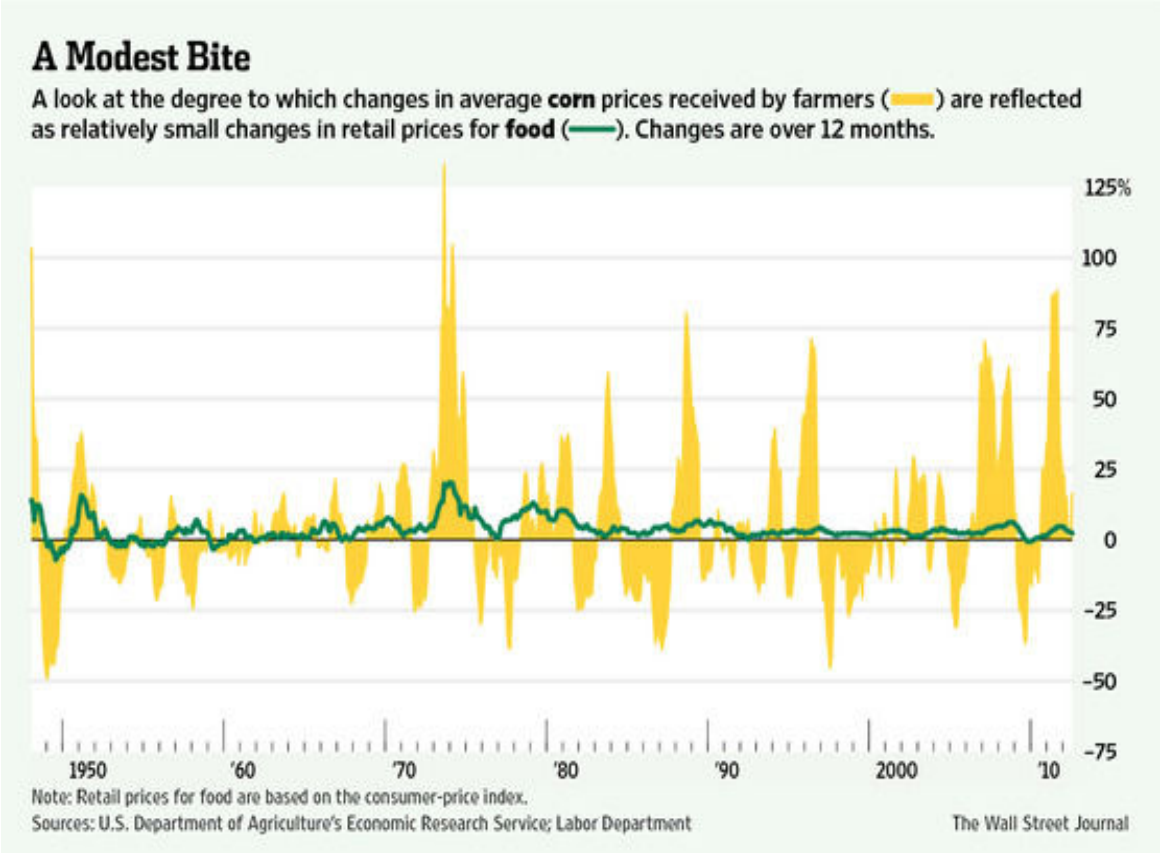
5. What has been the impact, if any, of the RFS on food prices?

Despite the hysteria created by oil companies who oppose the RFS because it enables renewable fuel to compete for market share with petroleum and meat/livestock interests who oppose the RFS because they feel entitled to cheap corn forever, the facts indicate virtually no correlation between prices farmers receive for corn or the RFS on retail food prices.

According to USDA's Economic Research Service, agricultural commodities make up just 14% of every dollar a consumer spends on food[3]. That means 86% of the consumer food dollar pays for everything else, including many costs related to oil and energy prices, such as food processing, packaging, and transportation. Furthermore, USDA is projecting food price inflation for 2013 to be within the historical average range.

To further illustrate how there is virtually no correlation between corn prices received by farmers and retail food prices, consider the graphic below, published in the September 4, 2012 print edition of the *Wall Street Journal*. The yellow lines represent the significant volatility in corn prices received by farmers, the green line represents comparatively insignificant changes in retail food prices in response to corn price volatility. As you can see, in more than 60 years of data, there is virtually no correlation.

[3] USDA ERS http://www.ers.usda.gov/media/131100/err114pdf and http://www.ers.usda.gov/data-products/food-price-outlook.aspx



While the *Wall Street Journal* editorial page notoriously opposes ethanol for politically-motivated reasons, at least some reporters there recognize that oil and energy prices have significantly more influence on retail food prices than commodities do.

USDA and the Department of Energy have determined that energy prices have twice the impact on retail food prices as corn. When we pay $1 for groceries, about 14 cents goes to the farmer. About 35 cents of that dollar pays for the energy to make, transport, process, and preserve the food we buy. When oil prices rise, so do food prices. If policymakers genuinely want to reduce food prices, they should support the RFS because it replaces petroleum with renewable fuel.

The United Nations and World Bank were quick to blame ethanol and the RFS for corn and food price increases that occurred in 2007 and 2008. But after a thoughtful review of the facts, both back-peddled and found that ethanol was not the major contributor.

In a September 2010 statement, a UN official said "A number of signs indicate that a significant portion of the 2008 price spike was due to the emergence of a speculative bubble. Prices for a number of commodities fluctuated too wildly within such limited timeframes for such price behavior to have been a result of movements in supply and demand…The 2008 food price crisis was unique in that it was possibly the first price crisis that occurred in an economic environment characterized by massive amounts of novel forms of speculation in commodity derivative markets."[4]

[4] "Food Commodities Speculation and Food Price Crises," September 2010, Olivier de Schutter, United Nations.

In a 2008 report, the World Bank originally cited biofuels production as one of the reasons behind the 2007-2008 increase in global food prices. But in a 2010 report and review of the facts, the World Bank said "…the effect of biofuels on food prices has not been as large as originally thought, but that the use of commodities by financial investors (the so-called "financialization of commodities") may have been partly responsible for the 2007-08 spike. We conclude that a stronger link between energy and non energy commodity prices is likely to have been the dominant influence on developments in commodity, and especially, food markets. Worldwide biofuels account for only about 1.5% of the area under grains/oilseeds. This raises serious doubts about claims that biofuels account for a big shift in global demand….it is striking that maize prices hardly moved during the first period of increase in U.S. ethanol production, and oilseed prices dropped when the EU increased impressively its use of biodiesel. On the other hand, prices spiked while ethanol use was slowing down in the U.S. and biodiesel use was stabilizing in the EU."[5]

While repealing the RFS may reduce corn prices by an insignificant amount for a short period of time, it would also discourage farmers in the U.S. and around the world from planting corn in 2013 and beyond, which is the exact opposite of what special interests lobbying the Committee for a repeal want.

Consider an analysis done by CNBC reporter Jane Wells[6], on the value of corn in a breakfast made up of a 16 ounce steak, two scrambled eggs, a half pound of bacon, and a glass of milk. According to USDA, this breakfast will cost about $9.57, and there'll be about $0.95 worth of corn in it, or around 10 percent. In other words, 90 percent of the cost of this very large breakfast is related to factors other than corn, such as labor, packaging, processing, and transportation.

Finally, ethanol producers make both food and fuel. Just as oil companies refine a barrel of oil into multiple products, ethanol plants refine corn into multiple products. Only the low-value starch in corn is utilized by ethanol plants today to distill ethanol. Most U.S. ethanol plants extract high-value oil from the corn they use for feed and biodiesel markets. Ethanol producers also convert all the high-value nutrients in corn to a high-protein distillers grain livestock feed. In fact, in 2012 U.S. ethanol producers supplied 34 million metric tons of distillers feed to the food industry, which represents enough to feed 200 million people for one year. In other words, on an equivalent basis, the feed that U.S. ethanol plants deliver is more than all other corn-producing countries in the world except for the U.S., Brazil, and China, making the U.S. ethanol industry the 4th largest corn supplier in the world.

6. What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?
While this question clearly presupposes the RFS is the primary driver of corn price increases, in responding to question #1, we explained that evidence from reputable sources proves that's not the case.

Cellulosic biofuels from a variety of feedstocks, such as corn fiber, corn stalks, woody biomass, municipal solid waste, and perennial grasses are poised to play a significant role in helping fulfill the RFS by 2022. ACE members are working to ensure the successful commercialization of cellulosic biofuel from may of these feedstocks.

[5] "Placing the 2006/08 Commodity Price Boom into Perspective" by the World Bank Development Prospects Group, July 2010.
[6] Retrieved from www.cnbc.com/id/48780397/Breakfast_in_America_The_Real_Cost_of_Corn. August 24, 2012.

7. What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramps up?

While a wide variety of feedstocks from different geographic locations will be utilized to produce cellulosic biofuels, several of these feedstocks will be derived from production agriculture, such as corn fiber, stalks, perennial grasses, and other ag residue. The production of cellulosic biofuel from agriculture-related sources will multiply the already substantial benefits ethanol provides to rural America. To wit, Sandia National Lab says there is 75 billion gallons worth of renewable feedstocks in the U.S. without competing with existing crop acres. Some reports indicate that full implementation of the 36 billion gallon RFS by 2022, including the diversity of feedstocks represented to make cellulosic and advanced biofuels, will create a total of 800,000 jobs in the U.S.

8. Will the cellulosic biofuels provisions succeed in diversifying the RFS?

Yes, as long as Congress does not weaken the RFS. Congress intended for feedstock diversity in establishing certain categories of renewable fuel production under the RFS. It is a critical policy tool in signaling predictability to investors of cellulosic projects. The RFS is critical to helping bust through the E10 blend wall to allow room in the marketplace for cellulosic fuels.

9. What is the scale of the impact of the RFS on international agricultural production and global land use changes?

We discussed the impact of the RFS on innovation and U.S. agricultural production in question #2, but the role the RFS has played in enabling farmers and technology firms to improve agricultural productivity worldwide cannot be overlooked. From 2000 to 2011, a period of time which includes when the idea for the RFS was developed by ACE and other stakeholders, when it was enacted by Congress, and implemented by EPA, world corn production rose 12 billion bushels as 43 nations, mostly in Africa and the former Soviet Republic, doubled their production of corn. Moreover, global grain production (coarse grains, wheat, and rice) reached 2.71 billion metric tons in 2012, the second largest-ever according to USDA and the UN FAO – despite record drought conditions in the U.S.

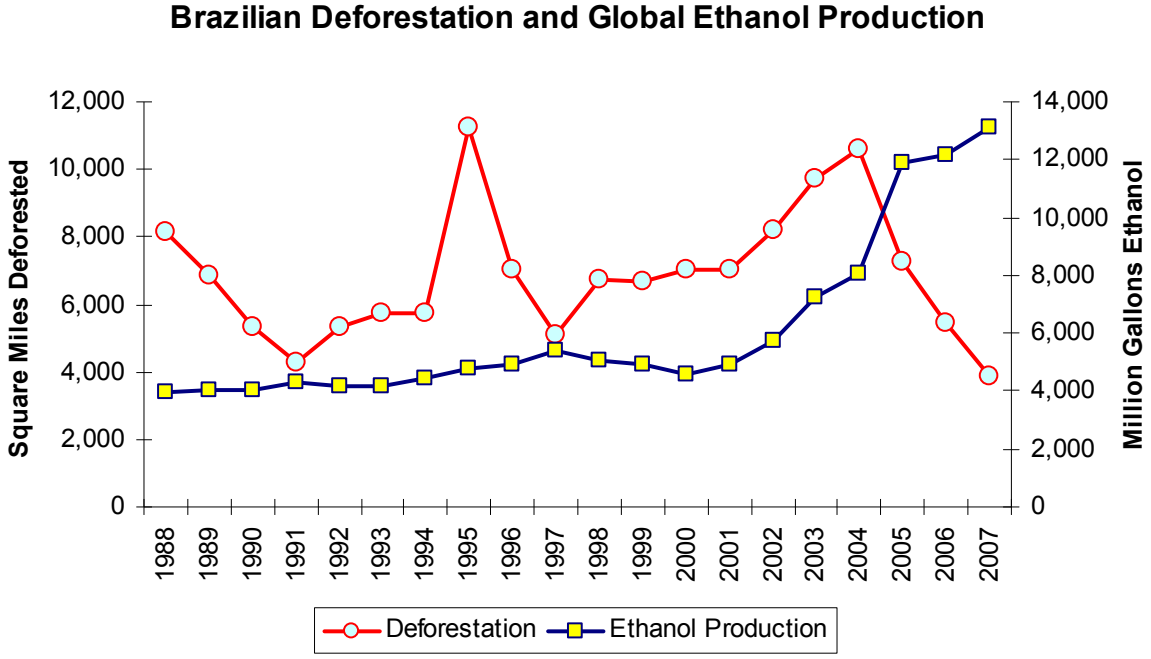
Repealing the RFS would simply discourage farmers around the world from planting corn, which runs contrary to what the meat and livestock groups supporting repeal want. Indeed, the RFS has provided a meaningful market signal for and economic incentive for global agriculture productivity.

The domestic ethanol industry is expected to use just 2.9 percent of the global grain supply in the 2012-2013 marketing year. The International Grains Council (IGC) recently forecast that the world grain harvest of wheat, and coarse grains such as corn would increase by 7% in the 2013-2014 marketing year on increased planting and better yields per acre. For corn, the IGC expects global output to increase 10%, with harvested area and average yields both projected to be higher.

So-called “indirect effects,” particularly global or international land use changes (ILUCs) are relatively new, unreliable, and controversial computer-generated predictions that are being selectively applied to renewable fuels in the RFS. The theory is that if more corn is used for ethanol in the U.S., somehow less corn is available for livestock feed rations, causing land owners literally halfway around the world to plow grasslands or slash rainforests to plant soybeans to replace the “lost” opportunity to feed the corn used for ethanol. In reality, ethanol is distilled from just one-third of a bushel of corn, the starch, and

another one-third of that corn bushel, the fat, fiber, and protein, is processed into a high-protein source of feed, a coproduct of the ethanol production process called distillers grains. This distillers animal feed product has proven to successfully replace corn and soybean meal in livestock feed rations, therefore mitigating the need to expand the global crop base.

To illustrate that ILUC models predict an outcome that in fact does not occur, it is instructive to review deforestation rates in Brazil. Real-world data shows that deforestation of the Amazon Rainforest actually declined from 2004-2007, the same period of time in which U.S. ethanol production enjoyed its most aggressive compounded average growth rate under the RFS.



Sources: IEA; Butler, Mongabay.com (FAO, NISR).

In a 2008 effort to better understand lifecycle analysis and indirect effects, ACE commissioned a study by Global Insight entitled "Lifecycle Analysis of Greenhouse Gas Emissions Associated with Starch-based Ethanol." Key findings from that report include:

- Changes in land use have always occurred and are not new, nor are biofuels the primary driver of them. Global population growth cannot be ignored as a factor.
- The scientific literature available to date shows a huge variation in estimates of carbon release from land clearing in general, on the order of 50 percent plus or minus – a huge margin of error that should not be relied upon to make policy.
- *If* some land use change is due to increased biofuels production, the overriding challenge is to quantify which changes can indeed be directly attributed to biofuels.
- If the indirect GHG emissions of biofuels are counted toward the carbon footprint, so should be the indirect emissions associated with petroleum production.

According to the study, it is virtually impossible to accurately ascribe greenhouse gas impacts to biofuels based on indirect land use change. The report also discusses how technology innovations are making both corn and ethanol production more efficient and carbon-friendly, developments that have not been

captured nor quantified adequately in measuring the carbon intensity of future sources of biofuels against future sources of petroleum.

ACE believes that if proper credit is provided to distillers grains co-products, which replace the need for corn and soybean meal in livestock feed, and if increased corn yields are considered, the 15 billion gallons of corn ethanol called for under RFS2 can be produced without any global land use penalties. Dr. Jerry Shurson, professor of Animal Science at the University of Minnesota, has also pointed out the lack of attention and understanding given to the use of distillers grains in animal feeds. He and USDA now both report that one metric ton of distillers grains replaces 1.22 to 1.24 metric tons of corn and soybean meal in livestock feed rations.[7] In other words, because ethanol production simply borrows the starch portion of the corn kernel to make ethanol, the remaining protein and nutrients in the corn kernel are concentrated in such a way that a resulting metric ton of distillers grains replaces more than one metric ton of corn and soybean meal in feed rations. The RFS helps make more feed, and food, available to the world.

ACE believes there is insufficient scientific consensus and real-world data of so-called ILUC effects to apply them to biofuels, but we would indicate that as scientists and economists try to develop more credible boundaries regarding what should and should not count as a carbon penalty, and as corn and ethanol production become more efficient, even with a ILUC penalty the carbon score for corn-based ethanol is much better than what is currently assumed.

Finally, trending sources of petroleum have appreciable indirect effects due to the expenditures in energy made annually by the U.S. military to protect oil supplies and transportation routes around the world, as well as land use effects and energy-intensive extraction methods (i.e. Alberta Tar Sands Oil). To ignore these petroleum-related indirect effects means that the comparison of emissions from biofuels versus petroleum is misleading. While attention has turned in recent months to "new" sources of oil in North America, such as Alberta Tar Sands or "tight oil" found in the Bakken Shale Oil Formation in North Dakota and surrounding states, it is only fair that the indirect effects associated with increased U.S. reliance of petroleum from these sources should be calculated.

[7] October 2011 USDA-ERS Report "Estimating the Substitution of Distillers' Grains for Corn and Soybean Meal in the U.S. Feed Complex" http://www.ers.usda.gov/media/236568/fds11i01_2_.pdf

AMERICAN FARM BUREAU FEDERATION®
600 Maryland Ave. SW | Suite 1000W | Washington, DC 20024

ph. 202.406.3600
f. 202.406.3606
www.fb.org

April 26, 2013

House Energy and Commerce Committee
U.S. House of Representatives
2125 and 2322A Rayburn House Office Building
Email: rfs@mail.house.gov

Re: Responses to Questions for Stakeholder Comment on White Paper Series on Renewable Fuel Standard and Agricultural Sector Impacts

To Whom It May Concern:

American Farm Bureau Federation (Farm Bureau) appreciates the opportunity to provide responses to stakeholder questions regarding the white paper series on the Renewable Fuels Standard and its impact on the Agricultural Sector. The following are our responses to the questions for stakeholder comment as stated in the white paper on April 18, 2013.

What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?

Over the past few years, the Renewable Fuels Standard (RFS) has been been charged as being a major culprit in generating higher commodity prices. This has been particularly true for corn. Placing all the blame for higher prices at the feet of the RFS is obviously wrong, just as stating the RFS does not have any impact ignores the fundamentals of economics.

Volatility in commodity prices has many causes. The 2012 drought caused and continues to affect crop and pasture conditions across much of the country. During the peak of the drought, more than 1,500 counties from across the United States were designated as primary drought disaster areas as defined by the United States Department of Agriculture (USDA). As of April 17, 2013, more than 1,100 counties from across the United States remain designated disaster counties. That drought also provides a valid case study of just how volatile the agricultural sector has become and the spontaneity with which the volatility can arise.

Last spring, planting conditions were nearly perfect. Farmers across the Corn Belt planted their crops well before normal dates due to unseasonably warm conditions during the spring. Because of this, yield expectations for last year's corn crop were initially projected at 166 bushels per

acre and many analysts predicted corn prices well under $4 per bushel – even with the RFS in place. Several livestock producers were actually in an expansion mode in the spring.
Then from mid June through August, drought conditions continuously worsened and yield expectations declined approximately 26 percent -- down to 123.4 bushels per acre. By late summer, all end users of corn were dealing with a dramatically different corn price picture. But even as agriculture was experiencing the worst widespread drought since the 1950s, the corn harvest still came in at more than 10 billion bushels, the eighth largest corn crop on record.

By all accounts within agriculture, 80 percent of agricultural land experienced drought in 2012, which made the 2012 drought more extensive than any since the 1950s. Moreover, based on 2011 value of production, at least 70 percent of both crop and livestock production was in areas that experienced at least moderate drought. As a result, during the peak of the drought (June 2012) to the end of August, monthly corn prices increased more than 30 percent, soybeans 20 percent and wheat 40 percent.

The drought's hardship continues to be felt primarily by people with direct connections to our nation's corn crop, either as the farmers who grow it, the livestock growers who depend on corn to feed their livestock or those who utilize it as feedstock for renewable fuels. Row crop farmers in many areas saw their crop reduced to waste, livestock producers saw the potential for massive losses pile up as the cost of corn hit record levels and people involved in producing renewable fuels saw the doors of their workplaces temporarily shuttered as the economics no longer penciled out.

To keep the drought's impacts in perspective, it is important to keep in mind that the general rise in the price of grains has not been limited to corn. Soybean prices also moved to new record levels over the past year. While this is due in part to spillover effects from corn demand, the tremendous demand growth in China and in developing countries also has played a large role. In 1996, China imported 320,000 tons of soybeans. In 2010, the Statistics Division of the Food and Agriculture Organization of the United Nations (FAOSTAT) reported that China imported more than 57 million tons from the global marketplace. This is an increase in imports of 177 percent from 1996. And around the world, the global middle class has been growing and generating greater demand for protein consumption.

U.S. farmers are expected to plant 97.3 million acres of corn this marketing year, the largest corn crop acreage-wise since 1936. Before this planting intention number was released, nearby corn futures were $7.23 per bushel. Once the report came out, corn prices immediately plunged 12 percent. If normal conditions persist this year and corn yields for this marketing year return to trend yield at about 156 bushels per acre, the United States could be looking at a record corn crop of 14 billion bushels. Under this condition, the farm price for corn is expected to average

$5.10 per bushel as compared to the $6.90 per bushel average reported from USDA for last year's drought stricken corn crop.

The economic realities of the matter are that market forces are working and farmers are reacting based on the market signals provided. Yes, the RFS has an impact on commodity prices. But the scenarios and associated analyses connected to reforming the RFS in the short-term have not been able to show that such a move would provide any meaningful relief for end users on the current price side for corn. Weather, foreign demand, currency fluctuations, as well as the economics of the ethanol industry are all contributing to commodity price volatility.

How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agricultural sector?

It is vital to note that many variables drive agricultural output. Although the RFS has increased economic growth within U.S. agriculture, increased productivity from within the U.S. agricultural sector has also been a major contributor. According to the USDA Economic Research Service, the level of U.S. farm output in 2009 was 170 percent above its level in 1948, growing at an average annual rate of 1.63 percent. Aggregate input use increased a mere 0.11 percent annually, thus indicating that the positive growth in farm sector output was substantially due to productivity growth.

Since the RFS was last reformed under the 2007 Energy Independence Security Act (EISA), net farm income has increased 83 percent, agricultural exports have increased by 52 percent, total livestock output has increased by 20 percent and total crop output has increased by 39 percent. Agriculture continues to be a bright spot within what some still consider a fragile economy in general terms aggregated across all sectors of the U.S. (and perhaps the world, for that matter).

From the 1980/1981 to the 2007/2008 marketing year, corn used for ethanol production went from be being less than 1 percent of total U.S. domestic corn usage to 25 percent of total domestic usage. To date, with the RFS in place, ethanol production is now utilizing more than 40 percent of the nation's corn crop, which in turn has increased the supply of ethanol production co-products. Both the dry-milling and wet-milling methods of producing ethanol generate a variety of economically valuable co-products. One of these co-products, and the most prominent, is dried distillers grains (DDGs), a valuable feed ingredient for livestock. Each bushel of corn used in ethanol production generates approximately 2.8 gallons of ethanol and 17 to 18 pounds of DDGs. As a livestock feed ingredient, DDGs are a proven component in feed rations for both dairy and beef cattle, and increasingly are being utilized in feed rations for hogs and poultry.

The impact of the RFS has also provided jobs to rural America. The Renewable Fuels Association, the trade association to the renewable fuels industry, indicates that 87,292 jobs were created from ethanol production in 2012. In addition, 295,969 individuals found work in positions indirectly affiliated with or induced by ethanol production. These jobs have provided good wages to those employees within the renewable fuels industry. According to a 2010 Ethanol Producer Magazine, 83 percent reported earnings at least $40,000 per year and 99 percent reported receiving health care and other benefits, which is well above the national average of 71 percent in 2010. Not only is the renewable fuels industry creating jobs for rural Americans, but these jobs are also providing good wages and benefits to those individuals as well.

As commercial development of utilizing cellulosic feedstocks for ethanol production is realized, more jobs and capital investment directly and indirectly will be coming to rural America. The KiOR facility in Columbus, Mississippi is the world's first commercial scale cellulosic transportation fuels production facility and will employ about 100 when operational. It has indirectly employed more than 500 people during the facility's construction phase.

Finally, researchers from the United States Department of Energy's (DOE) Oak Ridge National Laboratory concluded that the RFS has had a positive economic gain for the United States. The analysis indicated that the RFS will contribute and grow the gross domestic product (GDP) by 0.8 percent by 2022, which according to the Congressional Budget Office's February 2013 baseline represents more than $198.6 billion in 2022. In addition, the study concluded that increased use of motor fuel ethanol will hold down fuel prices by 3 percent in 2015 and approximately 7 percent by 2022. Looking at the latest available data, U.S. oil imports fell below 50 percent for the first time since 1997 and are continuing to fall, and are estimated at just more than 40 percent for 2012. Ethanol is not the only contributor to that import decline, but it is certainly a major factor.

Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

Farm Bureau was and continues to support RFS2. Farm Bureau believed EPA acted correctly in denying the 2012 waiver request. In our comments, we explained in detail three reasons why issuing a waiver would not have achieved the goals desired by those petitioning for a waiver. We maintain these overall concerns and place a priority on defending the standards and incentives necessary to further develop the U.S. renewable fuels industry. (Note: the first two reasons are outlined in this section; the third, later in our comments.)

Our first concern is that waiving the RFS will have uncertain impacts on corn prices. It is important to understand that the RFS is not a rigid mandate, but a mandate that provides

flexibility within the marketplace. It is important to understand that billions of gallons of renewable fuel are being blended into our finished gasoline and diesel fuels, but the foundation of the RFS program is built on the program that works through a unique serial number, known as a Renewable Identification Numbers (RINs).

Through the use of RINs, the RFS allows flexibility through both "banking" and "borrowing" provisions that allow obligated parties to apply RINs created in previous or future periods towards their current period's mandate. The RFS allows obligated parties to meet as much as 20 percent of their obligation with credits accumulated in previous years. An analysis from the University of Illinois, estimated that approximately 2.5 billion RINs were available for use in 2012, of which more than 2 billion were categorized as D6 Renewable Fuel RINs. The conventional ethanol mandate for 2013 is 13.8 billion gallons, but with an estimated bank of RIN stocks at more than 2 billion gallons, the effective mandate could be as low as 11.8 billion gallons, which is equivalent to approximately 4.2 billion bushels of corn.

Ethanol production declined substantially as a result of the drought and has not yet completely recovered. Ethanol production decreased 13 percent over a 6-week period as the economics of $8 per bushel corn and $2.50 per gallon ethanol caused plants to halt production. Since that rapid decrease, ethanol production continues to remain well below production levels seen over the last two years. However, despite the substantial decrease in weekly ethanol production, blenders met the 2012 RFS conventional biofuel mandate of 13.2 billion gallons through the use of excess RINs and above-level inventories, which served as a buffer against high corn prices. Furthermore, annualized ethanol production levels for 2013 are expected once again to meet the 2013 RFS conventional biofuel mandate of 13.8 billion gallons, with excess RINs from 2012 available to play a role if needed.

Waiving the RFS would not completely eliminate ethanol production. About one-third of the gasoline in the country would still need to include ethanol because of federal, state and local clean air rules, particularly in large urban areas on the East and West coasts of the United States. Refiners often produce gasoline with an octane rating of 84 and then blend with ethanol to boost it up to the regular 87 octane level sold at the gas station. Petroleum industry and refinery sources indicate that it may take anywhere from 3 to 6 months for refineries to adjust back to producing 87 octane instead of 84 octane. To make that change, it must be economically attractive for the refinery. Whether it would be economically attractive to continue using ethanol would depend on the price of other oxygen or octane sources compared to the price of ethanol. Industry sources still agree that ethanol remains one of, if not the lowest cost oxygenate source to boost gasoline to 87 octane. More importantly, it remains uncertain if refineries would actually make the change if a short-term waiver were perceived to be a one-time event.

Finally, the economics may not be that simple or clear on what a waiver of the RFS would accomplish. A recent study from Purdue University suggests the range of potential impact from an RFS waiver on corn prices is somewhere between $0 (zero dollars) and $1.30 per bushel. It is

important to keep in mind that the damage and economic harm caused by the drought can only be mitigated through a redistribution of the total loss across all affected parties, which include livestock producers, corn growers, ethanol producers and consumers, both domestically and internationally. From this study, it was clear that a high degree of uncertainty exists on the possible impact(s) of an EPA waiver of the RFS. If refiners and blenders have little flexibility in reducing ethanol use and substituting other octane and oxygen additives to meet their final product specifications, the waiver will do little to change the current market situation. Conversely, if they do have flexibility, issuing a waiver could help livestock producers and consumers of livestock products while imparting some negative economic impact on corn growers and ethanol producers.

The second concern is the overall impact on gasoline prices. Over Labor Day, prices at the pump reached an all-time Labor Day high with the national average at $3.83 per gallon, breaking the 2008 Labor Day record of $3.69 per gallon. Forty-five out of the 50 states saw higher gasoline prices this Labor Day as compared to last Labor Day. From Labor Day to the first quarter of 2013, consumers continued to deal with high fuel costs as prices hit record highs with the national average reported at $3.75 per gallon. To put this with the current economic climate, the United States had not seen gasoline prices (as a percentage of before-tax household income) this high since the early 1980s and 2008, prompting some to suggest gasoline prices could be much more of a burden at the pump if it were not for ethanol.

Ethanol is currently selling $0.33 per gallon less than a gallon of Reformulated Blendstock for Oxygenate Blending (RBOB) gasoline. This price spread essentially means that a gallon of E10 (gasoline containing 10 percent ethanol) is $0.03 per gallon cheaper than a gallon of conventional gasoline with no ethanol. As previously noted, refiners often produce 84 octane gasoline and then blend with ethanol to boost it to the regular 87 octane, which under current blending economics reduces the refiner's cost of producing gasoline. If refiners did not have access to ethanol, octane boosting would have to be met with other higher cost sources that would most likely be passed on to the consumer.

Biofuels also are playing a role in moving the U.S. away from foreign oil. Since 2000, domestic biofuels have helped reduce oil imports from the Persian Gulf region by more than 25 percent. U.S. oil imports fell below 50 percent for the first time since 1997, are continuing to decline, and are estimated at approximately 41 percent for 2012. Farm Bureau supports the United States being focused on energy independence by means of a comprehensive energy policy. The importance to maintain our biofuels production as both a hedge against gasoline prices and in terms of meeting fuel demand is clear.

Farm Bureau also understands the challenges faced with the "ethanol blend wall" the industry is currently facing. Because U.S. gasoline consumption effectively determines the "ethanol blend

wall" level, which has decreased due to a decrease in gasoline consumption, the gap between a 10 percent ethanol blend and the RFS mandate is expected to continue to grow.

One potential solution to this challenge is to increase the level of ethanol blended into gasoline. EPA has issued provisions allowing for the blending of up to 15 percent ethanol in gasoline, but only for vehicles produced after model year 2000. To date, there has been very little adoption of the 15 percent blend product because gasoline stations are unwilling to take a risk on this restricted market. E85 represents antoher option that has been in the market for some time. Although commercially available, widespread E85 acceptance is a challenge. While there are more than 8 million flex-fuel vehicles on U.S. roads today, the potential for growth in consumer preferences for flex-fuel vehicles is challenged by the limited accessibility of E85 at fuel stations. Currently, only 2 percent (2,339) of the estimated 121,450 gas stations within the United States have E85 available for customers.

The second challenge is the price of E85 and its lower energy density (compared to gasoline), which often puts it at a disadvantage when consumers calculated per mile fuel costs. On average E85 produces 27 percent less energy per gallon than gasoline. While the miles per gallon (MPG) math will vary by vehicle model, at current prices for gasoline ($3.62 per gallon) and E85 ($3.11 per gallon), it will cost the driver more to fill their tank with E85. Pricing challenges will have to be addressed in order to gain wide-spread acceptance of E85, just as other regulatory hurdles stand in the way of wide-spread adoption of E15.

Farm Bureau strongly supports working with the appropriate industries to solve these challenges to improve market penetration.

Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

Farm Bureau believes that Section 211(o)(7) of the Clean Air Act gives adequate flexibility to EPA to address any impact that the RFS may have on the economy. Section 211 (o)(7), *"Allows the Administrator of the EPA, in consultation with the Secretaries of Agriculture and Energy, to waive the requirements of the national renewable fuel standard, in whole or in part, if the Administrator determines, after public notice and opportunity for public comment, that implementation of the RFS requirements would severely harm the economy or environment of a State, a region, or the United States."* Farm Bureau believes that any definition or requirement of flexibility regarding this provision must be determined through sound economic assessment.

The carry-over RINs provided a cushion to meet last year's 2012 conventional biofuel mandate. For example, weekly ethanol production over a six week period beginning in June decreased 13 percent as ethanol plants halted production. Despite this decrease, blenders remained on pace to meet the 2012 RFS mandate by utilizing excess RINs. In addition, inventories above projected

levels due to the expired $0.45 per gallon tax credit further served as a buffer against high corn prices.

However, due to the blend wall, this cushion will be shrinking. Future mandates can still be achieved this year and beyond by using stored RINs, but this solution does have limits. The blend wall "gap" for 2013 is estimated to be 767 million gallons. While this can be filled using RINs from 2012, it means they will not be available for future shorfalls. With gasoline consumption trending downward and the mandate increasing, the gap obviously widens out in 2015. Farm Bureau remains committed to working with the energy industry with regard to addressing the blend wall issue.

In addition, if an economic assessment were to meet the definition as stated in Section 211(o)(7) of the Clean Air Act, Farm Bureau would be open to considering such a request

What has been the impact, if any, of the RFS on food prices?

Over most of the last 40 years, marketing costs for U.S.-produced commodities have increased at a faster rate than the prices farmers have been able to receive for their commodities. Since 1990, there have been 34 months in which the Consumer Price Index (CPI) for food went up at a faster rate than the CPI for all goods (minus food and energy). There were 245 months when the opposite was true. USDA's Economic Research Service food dollar series shows the farm and marketing cost split in a typical $1 food purchase. The farm/agribusiness share of the food dollar in 2011 was just 10.8 cents. The remaining portion goes to the marketing share, which involves all post-farm activities including processing, energy, packaging, transport, trade, servicing, advertising, labor and anything else required in the food supply chain. Energy and transportation costs together accounted for 9 cents in 2011 – almost as much as the value of the whole farm/agribusiness component, and those costs rose further last year.

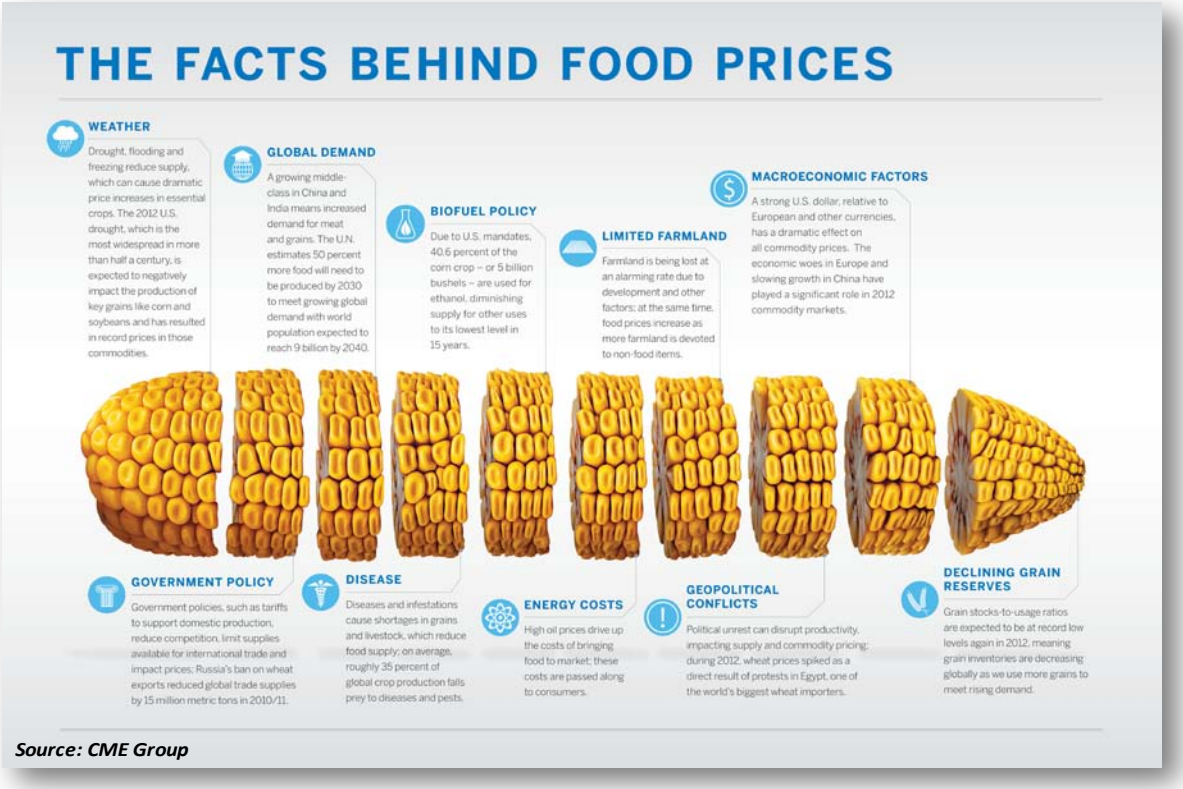
Yet increasing energy costs are just one part of the story resulting in higher food prices. The additional costs of food preparation and other services an also drive up the marketing share and diminishes the farm share as consumer demand for more convenience increases.

Logic would suggest the most direct impact of increased ethanol production on corn prices should be on the price of corn-based food products. But this ignores other production and marketing factors involved in the farm to table chain. For example: An 18-ounce box of corn flakes contains about 12.9 ounces of milled field corn. When field corn is priced at $3.40 per bushel (approximately the 20-year average), the actual value of corn represented in the box of corn flakes is about 4.9 cents. At $5.70 per bushel (the price for December 2013 corn futures contracts at the beginning of April), the value is about 8 cents, or 2 percent per box of corn flakes costing $3.75 at a grocery store. The 68-percent increase in corn prices results in less than a 1 percent increase in the price of that box of corn flakes, assuming no other cost increases.

Another consideration to examine is how producers have responded to market signals. In 1996, total use of corn for ethanol was only 396 million bushels; this marketing year, we expect to 4.55 billion bushels used for ethanol, an increase of approximately 4.2 billion bushels. But 1996 corn plantings totaled 71.5 million acres as compared to the 97.3 million acres USDA forecasts in its planting intentions reports for 2013. For 2012, the combination of increased acreage and improved yields, in spite of the drought, resulted in U.S. production being more than 1.5 billion bushels higher 1996.

Corn supplies have been tight for the past couple of years as the U.S. crop has been below trend yield for two consecutive years and the tightest since 1996 when corn stocks dipped to 426 million bushels, a stocks-to-use ratio of 5 percent. This marketing year we expect to see the stocks-to-use ratio around 6.8 percent at approximately 757 million bushels.

The Chicago Mercantile Exchange (CME) Group issued an educational brief that discusses the factors behind food prices. As illustrated in the following graphic, biofuels and related policy is one among many factors in determining the consumer food costs.



Source: CME Group

Figure 1: The Facts Behind Food Prices (CME Group)

What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramp up?

The commitment to developing advanced biofuels is critical in achieving the 36 billion gallon goal for renewable fuels sold in to the marketplace by 2022. In fact, by 2020, total volume of advanced biofuels is set to equal the volume requirement assigned to conventional biofuel at 15 billion gallons and will exceed the conventional biofuel requirements in 2021 and 2022. For 2013, the Energy Information Administration estimated that the available volume for cellulosic biofuel would be 9.6 million gallons, or 13.2 million gallons of ethanol equivalent. Currently, advanced biofuels still have yet to prove themselves as a reliable supply source.

The technologies needed are developing. In North Carolina, a 20 million gallon-per-year cellulosic ethanol plant is being built and expected to be on-line by 2014. This plant's main feedstocks will rely on cellulosic materials such as miscanthus, switchgrass and wood scraps and sourced from approximately 30,000 acres of marginal land by farmers close to the refinery. In addition, the North Carolina pork producers are part of the blueprint in the project, using these acres for spreading lagoon effluent as plant nutrients. The switchgrass and miscanthus are be able to fully utilize the nitrogen and phosphorus from the manure, resulting in better crop yields for the farmers with the co-benefit of helping hog producers with their manure management. When fully operational in 2014, this facility is expected to create more than 300 jobs and USDA estimates that this project will help pork producers net $4.5 million a year in increased revenue while continuing to help remove effluent from the state's pork industry. Creating uncertainty around the RFS would put such investments in question, eroding investor confidence in developing new technologies, as well as marketing opportunities for the row-crop and livestock sectors.

Just this past March, one of the two companies (KiOR) listed in EPA's proposed rule for cellulosic biofuel plants announced initial shipments of cellulosic diesel from its commercial facility. This facility uses pine wood chips that previously fed a closed down paper mill and produces gasoline and diesel, the first renewable hydrocarbon fuels in the U.S. manufactured at commercial scale and derived solely from non-food feedstocks. This cellulosic biofuel plant has a total employee population of about 100 at the facility and has contributed indirectly to hundreds more. During its construction phase, this plant supported a workforce of more than 500 individuals.

Farm Bureau supports full research and development for the increased production of all forms of renewable energy from agricultural resources, including solutions to help producers effectively

manage soil and water conservation issues. Farm Bureau is concerned that RFS reform could stall new investments and inject harmful uncertainty in a market that needs consistency from the Federal government in order to move forward.

Will the cellulosic biofuels provisions succeed in diversifying the RFS? What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?

Farm Bureau remains optimistic that the cellulosic biofuels provisions can succeed in diversifying the RFS. Even though the cellulosic mandate within the RFS has been waived every year by EPA, the prospects of commercial production are growing. Continued research and development work has resulted in increasing product yields and, importantly, lowering input costs. From 2007 through the second quarter of 2011, more than $2.4 billion was invested in advanced biofuel companies by venture capitalists alone. The goals set forth by the RFS are creating the opportunity for these new technologies and investments, raising prospects for job creation throughout rural America.

The key for cellulosic biofuels to mitigate the potential RFS effects on corn prices is becoming cost-competitive to corn-based ethanol. But it is not a simple correlation. As previously noted, corn prices for end users reflect many factors, of which ethanol production is just one. The cellulosic biofuel industry is still in its infancy, and Farm Bureau understands there are significant challenges the cellulosic biofuels industry is confronting.

One of the top challenges is the uncertain nature of crude oil prices. Nearly all of the renewable fuel technologies and related production costs today are affected by crude oil prices. Moreover, the outlook of future [and even short-term] crude oil prices remains highly uncertain. Within almost every business venture and new technology, there is a certain price point at which alternative goods become competitive with one another. The U.S. DOE 2013 Annual Energy Outlook (AEO2013) predicts three scenarios of crude oil prices: a reference price, a high price and a low price scenario. By 2040, the reference price for U.S. crude oil is projected to be $160 per barrel with the high price scenario projected at $235 per barrel. Furthermore, the range between the high and low price scenarios by 2040 is $162 per barrel. To alleviate this concern, continued research in cellulosic biofuels needs to occur; such research could further improve business efficiencies with the goal of making domestic cellulosic biofuel plants regularly competitive with other fuel sources.

Second, overall technology and production practices remain a challenge. Since there is very limited production of biofuels from cellulose, understanding the true costs of production is still uncertain. Transforming cellulosic feedstocks into liquid fuels can be done in two ways: biochemical and thermochemical. These processes generally have prohibitive capital costs, and

the associated costs from these processes remain highly uncertain. Further research and development will help provide certainty as cellulosic production efficiencies improve.

While obvious challenges exist with cellulosic biofuels meeting the RFS targets in the near-term, the potential is substantial. Farm Bureau will continue to support further research and development of cellulosic biofuel and renewable fuels.

What is the scale of the impact of the RFS on international agricultural production and global land use changes?

Overall, the production of the 2012/2013 corn crop declined 13 percent after seven years of growth in production – again, last year's drought was a key factor in the decline -- and world corn crop declined by 3 percent. Even with the 3 percent decline, the world corn crop corn crop was the second-largest on record trailing only the 2011/2012 marketing year. Corn prices spiked over $8 per bushel last year, effectively forcing shared demand rationing among end users. Corn used for ethanol accounts for 14 percent of world production. Similar to domestic commodity prices, international agricultural commodity prices have risen over the past several years and research by the National Academies National Research Council suggests these sharp increases in international agricultural commodity and food prices have likely been largely affected by droughts and other supply disruptions.

One of the most debated issues related to the ethanol industry over the past five years has been the issue of indirect land use change (ILUC) resulting from biofuel expansion. Measuring ILUC is a convoluted process that yields significant uncertainty around any generated answer. Assumptions, analytical model structure and the degree to which cross commodity effects are (or are not) captured are critical. The ILUC theory relates to the unintended consequence of releasing more carbon emissions because of land use changes around the world induced by the expansion of croplands for ethanol or biodiesel production in response to global demand. Recent studies suggest ILUC effects are much less significant than were initially postulated and may well be approaching insignificance.

Early in 2010, a Purdue University study showed the predicted ILUC emissions associated with corn ethanol expansion were 86 percent lower than first published ILUC estimates, and were less than half of the estimates finalized by the California Air Resources Board (CARB) and EPA for the recently implemented Low Carbon Fuels Standard (LCFS).

Researchers from Oak Ridge National Laboratory suggested that ILUC associated with biofuels expansion in the U.S. was likely negligible and that minimal to zero ILUC was induced by use of corn for ethanol over the last decade. The Oak Ridge analysis used complex, real world data from 2001 through 2008, a period of significance as U.S. ethanol production quadrupled during

this period. The analysis further concluded that empirical evidence did not support significant effects on U.S. commodity exports and other crops or cropland expansion in the U.S.

Michigan State University researchers found that significantly larger volumes of biofuels can be produced without incurring ILUC. The researchers concluded, *"Using less than 30% of total U.S. cropland, pasture, and range, 400 billion liters (106 billion gallons) of ethanol can be produced annually without decreasing domestic food production or agricultural exports. This approach also reduces U.S. greenhouse gas emissions by 670 Tg CO2-equivalent per year, or over 10% of total U.S. annual emissions, while increasing soil fertility and promoting biodiversity. Thus we can replace a large fraction of U.S. petroleum consumption without indirect land use change."*

It is clear that challenges lie ahead in the development of new renewable fuels from feedstocks other than corn. It is also clear the use of renewable fuels is enhancing our energy security. Farm Bureau supports and defends the standards and incentives necessary to further develop the U.S. renewable fuels industry. At the same time, as the largest general farm organization representing farm and ranch families engaged in raising all types of food, fiber and fuel commodities, we are aware there are multiple effects on consumers and end users that result from higher commodity prices. Thank you for giving us the opportunity to comment on this extremely important issue.